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HUMAN LIFE AND THE BODY

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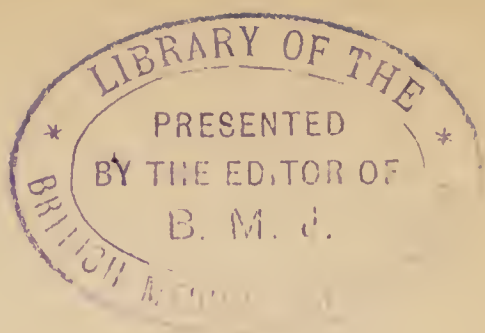
Dr. A. RABAGLIATI

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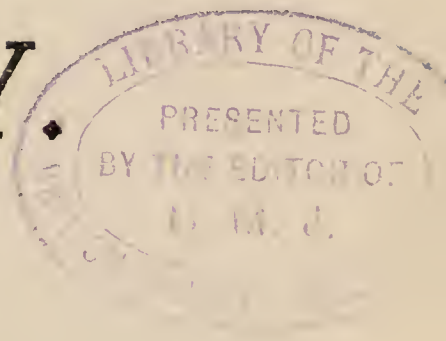
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HUMAN LIFE AND THE BODY.



An Essay on the force of Man-life, and on the present state of medical opinion and practice, shewing how the deplorably low condition of both is mainly caused by the blindness which persistently refuses to recognise that force as the immediate cause of the human body; and shewing how human life may be made longer, healthier, happier and more efficient for its purposes.



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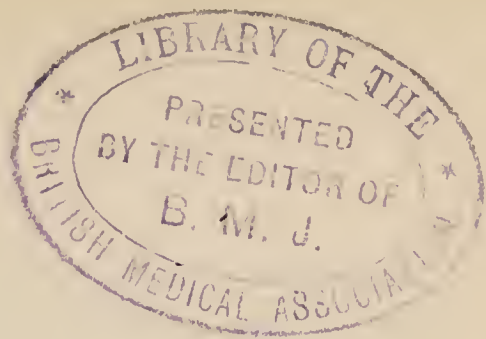
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THE QUESTION.

Is it my view does not with truth agree
 That I so little of acceptance find?
 Or is it that a perverse twisted mind
 Disturbs my sight, distorting all I see?
 Surely, if slowly, has it come to me—
 Such is the murmur fronting and behind—
 This strain I hear the distant horn clear wind:
 How glad would I that sweet sad music flee—
 The way to life and health is through restraint;
 It is not I but Nature sayeth so;
 This voice is heard in all the winds that blow:
 'Gainst Nature then not me be the complaint.
 I do but utter what I hear; I must
 Repeat the strain: then for the issue trust.

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EPITOME.

TITLE OF ESSAY—INTRODUCTION.

(Page 4). Definition and object of human body. Likened to machine. Is a machine made by man-life to do all the work of man-life. Made for work not for idleness. The varied work of man-life. Kinds of work performed by man-life.

(Page 4). Respiratory organs developed from digestive tract. Purposes: to carry off waste products and to admit oxygen. Mechanical work of body—Motion and locomotion.

(Page 4). Sensation, perception, consciousness, as manifested through the body. Observing, reasoning, emotion, will, worship. Man-life a variety of the universal energy. Relations to other forms of life.

(Page 5). Acts as medium of its own reproduction. Not necessarily through ancestors, although usually so. The human form arose when the environment was ready for it.

(Page 5). Preparation for it through long ages. Mutation. Simultaneous appearance and successive succession. Come for all things are now ready. Time which begins shall also (page 5) be no longer. The allegorical Adam died when born at 930 years of age.

INTRODUCTION.

THE DEFINITION AND OBJECT OF THE HUMAN BODY.

The human body has often been compared with a machine; and it seems that it is best studied if we view it as a living machine made by the force of man-life for the purpose of acting as the medium or means of doing all the sorts of work that man-life is capable of accomplishing. The body seems to be made for work or service. It cannot thrive by idleness, but can be efficient and healthy only if it is used as the instrument of doing all the sorts of work for which it is adapted.

These are very many and very varied, and include the nutritional work of assimilation of food into blood and body-stuff, through the digestive and blood—and lymph-forming organs; the circulation of the blood and lymph and other fluids of the body; the action of the whole digestive processes; and particularly the assimilative processes of the small intestine as well as the eliminative processes of the large intestine; of the skin, kidneys, etc., and of the respiratory organs. These last, as they are developed from the digestive tract, act as a means of ridding the body of the waste products of the digestion, as well as of introducing oxygen into the blood. Besides these more or less internal sorts of work, as they may be viewed, the body acts as a means of doing the mechanical or outer work of motion, as of moving the muscles of all parts and especially of the limbs when doing what is called work, whether directed by purpose to mechanical ends or not. The muscles and other parts can be further used as a medium for effecting changes of place for the body or for effecting locomotion.

Then, besides being the means of doing these lower sorts of work, the force of man-life makes and maintains the body as a means of effecting a large number of other sorts of work, as those of sensation, perception and consciousness. This it does by the introduction of cells united with one

another by fibres. Finally, through an ever increasing complexity, both of structure of parts and of joinings of the same to one another, the force of man-life makes of the body the means of manifesting the higher faculties of observing and reasoning, of emotion, of willing and of worship. If the force of man-life is a variety of the life-force in general, which in turn is a division of the universal energy, which, emanating from the only Source adequate to account for it, is the immediate cause of the universe as we know it, this view seems to give an intelligible account of the formation and action of the human body.

A similar view can be taken, and seems to be equally illuminating as to the origin or the formation and characteristics of the bodies of other animals, and plants as they offer themselves to our observation. Like other living machines also (particularly animals and plants), the human body acts as the medium of its own reproduction and perpetuation; although, like other living machines, it probably arose in the first instance (that is, when, all things being now ready, and the environment well prepared for it, the human life-force took bodily shape) without the intervention of ancestors. The human form arose because the environment prepared for it was now suitable; and the force of man-life hearing the invitation—come for all things are now ready—occupied the medium or environment that had been prepared for it, over a long course of untold and perhaps even untellable ages.

Further, when the time arrived, when all things were now ready for the occurrence of the mutation, the force of man-life appears to have procreated the human form, whether black, yellow or red or white, at all ages and stages simultaneously, specimens of both sexes appearing or arising as old, middle-aged, mature, adolescent, juvenile, infantile and unborn simultaneously. Very likely the black, yellow, white and red varieties of the human form arose at different times in the history of the earth, though, when it arose, each variety no doubt appeared at all different ages and stages at once. It seems as if each variety acted not only as if it heard the call "come for all things are now ready," but also as if it heard the call that as for it time now begins to be,

so in due course a period will arrive when time shall be no longer. Thus specimens of all the different ages and stages that afterwards appear in successive succession seem to have arisen simultaneously. If we may not perhaps speak of that as simultaneous succession, we may speak of it as simultaneous appearance. The allegorical Adam or first man would thus arise at 930 years of age, with all his experiences in him, dying, probably when he was born, and in the presence not only of his sons and daughters and all his descendants, but also among the multitude of other specimens of humanity who arose simultaneously at their respective ages, and some of whom (since they did not all attain the same ages) probably died before him.

CHAPTER I.

The Human Body viewed as a Machine. Comparison of it with a
Steam-Engine.

CHAPTER I.

EPITOME.

(Page 14). Comparison between human body and steam-engine. Differences greater than likenesses. Failure to see this the chief cause of misunderstanding of body.

(Page 15). Nature divisible rather into more living and less living than into living and dead. What are called not living machines are responsive to physical forces like gravitation and chemical forces. The body responsive to the life force, which governs physical forces.

Life force lives in its machine; maker of inanimate machine lives away from it. Is life not more than the sum of its phenomena? Or than organisation in action? Is it not also the cause of the phenomena; and of the organisation? The name to live without the power. Mystery that modern thinkers do not admit existence of life-force. All forces are varieties of the universal energy which, proceeding from the only source adequate to account for it, has more qualities than the infinity, eternity and omnipotence usually attributed to it. The life force a sister force to gravitation, for all natural forces so merge into one another as to be inseparable, and perhaps are separate only in appearance to our faculties and not in reality. Motion common to them all (page 16). One in many, and many in one. The life force in two divisions—plants and animals. The heat or temperature of the body. Heat of body an inherent or intrinsic quality, maintained at about the same level in all conditions of life. Temperature of body, however, only an average and may vary as pulse rate and respiratory rate do. Differences between so called animate and so called inanimate bodies, curved and straight boundaries, etc., but even the inanimate not quite definitely defined. A difference of temperature not necessarily a sign of disease. Rather a wave rather than a line. Body heat

not affected by arctic cold or tropical heat or warm temperate regions; nor by seasons; nor because of nutritional mechanical, sensational, intellectual and emotional work, or of will or worship. Chief reason why it is thought that food combustion is the cause of body-heat, because observations originally made in cold and temperate countries. (Page 18). Fallacious. Is coal or wood the cause of the heat of the fire? Or is the cause the chemic energy combining O and C, which liberates heat to show its presence? Coal will not burn in a vacuum. If oxygen had to be paid for, we should have argued that oxygen was the cause of the heat of the fire, as we now do that coal is. But (page 18) fallacious. Kinetic chemic energy the cause of fire and heat. Not coal nor air; not O nor C. Waste of coal and liberation of heat effects of a common cause, viz., chemic energy; and not cause and effect of one another. (Page 19). The monodynamic and pandynamic of the universe. No thing can withstand action of force without wasting. Human body also wastes, and must be restored by food; but restoration not accompanied by increased heat as in fire. (Page 19). Energy procreates. God only creates. These points mentioned because of their practical bearing on health. Arising of very interesting and very profound questions. Pure force of physicists almost unintelligible. Some forms of matter indistinguishable from spirit. Must body waste in mere act of living? Some substances sustain energy without being themselves consumed. Bush burning, but not consumed. Perhaps light and fire may exist to illuminate and warm by intrinsic power. (Page 20). Independent of matter. Nervous system hardly wastes in fasting. Human reason opposed to idea of intrinsic light and heat independent of waste of substance. Hence we imagine the life heat to be kept up by food. But if good advice is to be given, clear ideas must prevail: hence the chief reason for referring to the subject. (Page 21). Life a form of kinetic energy which may be intrinsically warm, but human reason objects to this interpretation, and still more to the inquiry why it may be so. (Page 21). Folly of opinion that food is the cause of the body-heat as coals of fire-heat. The need of philosophy,

and the impossibility of doing without it.

(Page 21). Science what? Philosophy what? Both necessary. But Philosophy much more necessary than Science. The erroneous advice that follows wrong views; and its damage to life. Regret that the electric machine has not been sooner invented, for its analogies are closer to body than are those of the steam-engine. Need of machine to be in order if electric force is to run freely (page 22). As electric machine will not work unless electric current is running, so bodily machine will not work unless life-current is running. Forces never perceived directly; not even the life-force, but their presence inferred from their effects.

(Page 23). A wire conveying an electric current warmer than one not conveying one: wire warmed by electric current; body is warmed by life-current.

(Page 23). Life-force intrinsically warm. Want of harmony of powers in man's nature the cause of the disorder in man's world.

(Page 24). Fuel does not become part and parcel of the fireplace; but food must be assimilated into the body before it is used.

(Page 24). Why should Nature have produced sugar and oil in the tropics and olive oil in warm temperate regions, if food is the cause of bodily heat? Folly of the received opinions as to the calorie values of food.

(Page 24). The body is not a chemical, but a vital laboratory; and food assimilated into body at temperature of body which is maintained by force of man-life and not by food. In tropics, outside heat many degrees higher than body.

(Page 25). Accepted doctrine absurd. But philosophy more wrong than science; though both wrong. Fire heat rises by hundreds and even thousands of degrees; not so body heat.

(Page 25). Body heat may rise a degree or two in the body by working only. Far more differences than analogies between the body and the steam engine. Even when scientific men have seen the folly of ingesting too much food into the body, they have often given wrong explanations, why, it is foolish to do so. It

is wrong to put too much food into the body, but not because to do so burns up the body as too much fire burns up the boiler flues. Body is blocked and choked, and often its temperature falls by taking too much food, as a copper wire gets blocked and its constitution gets altered by having to convey a current for too long a time; or a rubber tube breaks instead of stretching when improperly managed.

(Page 26). Bodily heat often lowered by too much food. Hence the fallacy that the condition should be met by increasing the food. The proper way to look at it and to treat it is rather to increase the draught by putting the poker in than to heap more coal on.

(Page 26). Assimilation of food into body takes place at the temperature of the body, which is maintained by force of man-life inhabiting it and not by food. The fallacy formerly entertained that the lungs must be the warmest part of the body because Co_2 is given out there as Co_2 and smoke are given out at the fireplace.

(Page 27). But although this fallacy has been exploded, ideas are still very crude. The changes in a wire conveying an electric current offer a much better analogy; or even the changes which make rubber break in place of stretching. The heat of the steam engine is due to chemico-dynamic, of the electric motor to electro-dynamic, of the animal-body to zoo dynamic, and of human body to anthropino-zoo-dynamic or man-life.

(Page 27). Physicists nearly always believe that things cause forces. Perhaps, however, forces may cause things; and perhaps things and forces are co-ordinated effects of a common cause. The same considerations govern conceptions as to the relations of germs and diseases, as diseases may introduce germs to cure diseases, or germs and diseases may be the effects of a common cause, viz.:—mal-nutrition. (Page 27). Blindness to this makes doctors give wrong advice, and makes them fail to live longer or work better than the laity. Steam-engine is a machine for producing heat, while the body is no such thing, but is (page 28) warm because man-life is warm. All forms of kinetic energy are warm (and luminous). Moving things are warmer than still things. Warmth above the surrounding medium seems an

invariable quality of kinetic energy. So is luminosity. But (page 28) the true inference ought to be that all kinetic energy is warm and luminous. Not that it is warmer and more luminous than its surroundings, because man-life in the tropics, though not so warm as tropical heat, is still kinetic. And lights also may be more brilliant and paler and yet each may have its proper sphere (page 29).

(Page 29). Variations in bodily temperature are comparatively slight. In 50 years no greater difference than 14 degrees observed between highest and lowest records. This must be due to internal regulating force of man-life. One remarkable record (page 29). Statement of a great scientific man that there is no need to search the skies for a vital force. Criticism of this (page 30), and of the further statement that "all biological reactions are determined by physico-chemical laws, that is by molecular structure." Vital force may determine physico-chemical reactions and may determine also molecular structure. Again, the three possible explanations: things may cause forces; forces may cause things; and things and forces may be co-ordinated effects of a common cause, viz.: the pandynamic and the monodynamic of the universe. (Page 31). Surprise how different may be the views of different men regarding the same things. Criticism of the view that life is not a form of energy because it regulates energy. (Page 31). Why may not energy be self-regulating? or even unembodied? (Page 32). All varieties of the one pan-dynamic seem to embody themselves in corresponding forms. Is the introduction of ether, as the means of acting at a distance, a necessity of Nature or only of our minds? May not energy determine space as well as be determined by it?

(Page 33). May not some varieties of energy be self-regulating and self-determining?

(Page 33). Two great laws in the universe. First: attraction the widest in range. Second: improvement seems to come through some amount of self-restraint (page 33).

(Page 34). Behaviour of the nervous system is fasting: it hardly wastes at all. Meaning of this. (Page 35). Why should the circulation of the blood in brain cease to be

synchronous with the action of the heart and become synchronous with the respiration? (Page 35). Perhaps it is in order to diminish the danger of apoplexy.

(Page 35). Apoplexy as a cause of death. Greater among women than men. Why? Is it because of the food habits of women? And cancer.

(Page 35). Folly of the scientific men who are carried away by the delusional analogies of the body to the steam engine, and of those who say that there are many useless organs in the body.

(Page 36). Function of the appendix vermiformis: and of the large intestine. Has Nature made anything in vain?

(Page 36). Persons holding wrong views as to functions of body will legislate in opposite ways to those who hold right views. The differences are not classifiable as materialistic and idealistic because some sorts of matter are so rare or thin as to be indistinguishable from spirit.

(Page 37). Unsafe to legislate in matters of opinion.

(Page 37). Parliaments too compulsory: too fond of punishment, too compulsory and too little persuasive.

(Page 37). This really is tyranny: unworthy of the Parliament and of a free people, who are, however, too ready to be blinded by an appeal to their greed. Arrogance of the assembly which assumes that it, and not the people, know best what is for their interests. This assumes that the will of the majority, and not the laws of nature, is the test of truth. Consequent introduction of the anomalies of enfranchisement of paupers and of unequal taxation alongside of equal representation. This puts the thrifty under the government of wasters, the industrious under the idlers, and the self-respecting and self-restraining under the vicious and self-indulgent. The same blindness will be carried into State medicine, which has characterised State ecclesiasticism, and there is a danger that medicine may become political rather than sanitary, just as some religious sects have become political and partisan rather than religious. (Page 38). Parliament seems intent on introducing into State medicine the same compulsory and punitive methods which have failed to produce religious unity, and which will equally fail in health affairs. (Page

38). As some religious sects have become more political than religious, so it is likely that official medicine will be more political and partisan than sanitary. (Page 38). This has led to the loss of respect of Parliament of late so apparent. Parliament should beware of laying itself under the reproach of betraying the people's interests. Inconsistencies of parliamentary representation.

(Page 39). The most promising systems may be degraded by ignoble passions. Suggestion that it is easier to vote for wages than to work for them. People themselves to blame. 'Ca' canny.' If people still ignorant after two generations of education, are we getting value for our expenditure?

(Page 39). Minimum wage irrespective of minimum output. Legislature has voted itself a salary without regard to duty to be done for it. Some members refuse to attend the Parliament and still draw salaries. People follow lead of representatives. But both people and representatives believed capable of better things. (Page 39). Nearly all would agree that it is better to give than to receive. Misleading to say the only way to make poor richer is to make rich poorer. (Page 40). Both enrichable by work. Improvement possible not by class antagonisms and wrangling, but only by good will and not by government by the avaricious multitude, but by love and helpfulness.

(Page 40). Society cannot be stabilised or made progressive by pursuit of self-interest enlightened or unenlightened, but only by altruism. People cannot obtain health from an official class who have not proved that they understand health and who, even if with their mouths they preach self-restraint as the way to health, will by their conduct insidiously suggest self-indulgence.

COMPARISON OF THE HUMAN BODY WITH A STEAM ENGINE.

The human body has often been likened to a steam engine; but there are so many differences between the body and a steam engine that the differences are far more numerous than the likenesses. In fact, the differences are so

numerous and so vital that it is not an exaggeration to say that more serious misunderstandings as to the working of the functions of the body have arisen from men's minds having been carried away by the analogy than perhaps from any other single cause. Every one can see, of course, that there must be many and great differences between a living machine, like the human body, and an inanimate machine, like a steam engine or a petrol-driven motor car. Even if we think (as I do) that a much better division of the phenomena of the universe is to distinguish them not as living and dead or as animate and inanimate, but as divisible into more living and less living, into more animate and less animate, still the differences are very striking. The response of the living machine to nutritional and mechanical work is very much more marked than that of the not living—not to mention intellectual, emotional and higher sorts of response. The not living machine is responsive only or mainly to gravitation, to crystallisation and to chemical and physical forces. The living machine on the other hand, uses gravitation, crystallisation, capillarity and chemical elements and forces for its own purposes, at first apparently unconsciously, and later, through the introduction of constantly increasing complexity of structure, more and more consciously.

Besides this first marked difference between the two sorts of machines, there is this striking difference in the second place, that the maker of the mechanical machine lives away from it and has to be applied to if anything goes wrong with it, while the life-force which is the immediate pro-creator of the living machine or living organism, dwells in it. Of course, it should be remembered that modern thinkers, or some of the most eminent of them, define life as the sum of its phenomena, and others as organisation in action. To many or even most scientific minds it appears to be more than doubtful whether there is a life-force or life-forces at all. Life is undoubtedly the sum of its phenomena; it is undoubtedly organisation in action; but if it is no more than this and if it is not also the cause by means of which the phenomena are what they are, or if it is not also the cause by which the organisation through which life acts comes into being and into suitability for the expression of life, then in

both cases we may have retained the name to live indeed but have deprived ourselves of its power. How modern thinkers who, in order to understand the order and majesty of Nature, find themselves compelled to assume a gravitating force to account for the phenomena of gravitation, or chemical force to account for chemical phenomena, or electric force to account for electric phenomena, do not find the same compulsion forcing them to assume the existence of a life-force or life-forces to account for vital phenomena, is a mystery, of which however some explanation will be offered later. These forces are evidently forms or varieties of the one omnipotent infinite and eternal energy by which all things do consist. The Source from which this universal energy emanates must obviously be one which is adequate to account for it; and when the energy is examined even for a little while, it is soon found to manifest many other qualities besides omnipotence, infinity and eternity.

As this will be very evident as our examination of the machine made by the force of man-life proceeds, no more need be said regarding it now except perhaps this, that the life-force (bio-dynamic) is a sister force to the force of gravitation (hylo-dynamic or the force of material substance) to chemico-dynamic, to electro-dynamic and to the other forces which make up the one energy or mono-dynamic or pan-dynamic of the universe. All these forces are convenient divisions of ours, as their assumption affords us better facilities in our efforts to understand the world in which we find ourselves; but it is doubtful if they exist in Nature at all. At least they all merge so into one another that no hard and fast line exists between any two of them. Physics, chemical changes, crystallizations, motions, colloidal formations, osmotic formations, organic, coccal, protozoal forces all insensibly merge into one another in inseparable ways. Motion is common to them all. Further they are alike in this that they are one in many and many in one. The life-force is not different in this respect, for it speedily breaks up or divides itself when we come to examine it, into at least two great divisions, the forces which translate themselves into plant life (phyto-dynamic) and those which tran-

slate themselves into animal life and procreate animal forms (zoo-dynamic) usually by means of ancestors though not by any means necessarily so. The machine that is procreated by the force of man-life or anthropino-zoo-dynamic is, along with the force which procreates it, the one which is to occupy our attention.

THE HEAT OF THE BODY OR ITS TEMPERATURE.

One of the most striking features or qualities of the human body is its temperature which is normally about 37°C or 98.4°F . This level of temperature is, however, only an average and not a definite level, for it may vary, by a degree or two both up and down and yet health may be maintained just as the pulse-rate may vary from 60 to 90 a minute, and just as the respiratory rate may vary from 10 to 20 a minute without health being interfered with. The impossibility of fixing definite limits to the phenomena of living things as distinguishable from the greater definiteness which we seem to be able to attribute to those we call inanimate is perhaps the most striking quality they exhibit to inquiry. Definite measurable angles, and lines more or less straight, seem to characterise the contours of bodies we call inanimate, while the animate are characterised by rounded and curved contours and rounded angles unmeasurable or even futile to measure, since they continually vary from time to time. Even the inanimate forms are not quite definite and invariable, although they are much more so than the animate, and this is perhaps the chief difference that characterises and differentiates them. A difference, therefore, of a degree or two from 98.4°F in the upward or downward direction does not necessarily mean absence of health or the onset of disease. Health is not so much a line as a wave. So long as the wave is not too high, or the depression between any two waves too low or too deep, health, or that indefinable state which we call health, may be maintained. The normal temperature of the human body, tending to a level of 98.4°F . and varying a little up and down, is not specially affected by arctic or antarctic cold nor by tropical heat; nor does it vary because it may be living in the warm

temperate regions of the earth, nor yet does it vary because of acting as the instrument of doing nutritional, mechanical, sensational, intellectual or emotional work, or of acting as the instrument of will or worship.

Because observations on the temperature of the body were originally made in cold and temperate countries, where the most striking fact usually observed is that the body temperature is higher than that of its environment, and because men saw, or thought they saw, that fuel is the cause of the heat of the fire of the steam engine, they leaped to the conclusion that food-combustion is the cause of the heat of the body ; and the more so because they found that CO_2 , the chief product of combustion, is given out both from the chimney of the fireplace and from the lungs, which seem to act as the chimney of the body. But a little reflection would have sufficed to keep them right. It seems, no doubt, plausible at first sight to assume that, say coal or wood, is the cause of the heat of the fire ; and the argument sounds convincing that it must be so, because if there is no wood or coal supplied, there is no increase of heat. True, but if there were no air admitted to combine by its oxygen with the carbon of the wood or coal, there would equally be no increase of heat. Coal will not burn in a vacuum. And they who argued thus plausibly about the coal did not see, nor do they seem to see now, that if they got their coal for nothing, as they now do their oxygen, and if they had had to pay for the air from which they freely get their oxygen, they would, no doubt, have argued that oxygen was the cause of the heat. Had they done so, the argument would have been equally valid (or invalid), as it now seems to be about the carbon of the coal, for, assuredly, if they had not taken means to supply oxygen they would not have had any increase of heat in the fire place of the steam engine.

It is almost impossible to get men to see that it is neither the coal nor the air, that it is neither the carbon nor the oxygen which is the cause of the heat of the fire, but that it is the action of the kinetic force of chemical energy which is the source of the heat by combining the carbon and the oxygen and so liberating heat, because all kinetic energy is warm. (We should ask ourselves if the increased heat is

produced by the waste of the carbon and the oxygen, or produced by chemic energy ; if, that is, the heat is produced by things or by a force, or if perhaps the waste of the things and the liberation of heat may not be effected by a common cause, viz. : the action of the universal energy or pan-dynamic or mono-dynamic whereby all things do consist.) Kinetic energy (in this case active chemico-dynamic) shows its presence by combining the carbon and the oxygen and liberating heat. It does another thing also, for it wastes and consumes both the coal and the air, though we do not perceive the latter because we get it for nothing, not having to pay for it. We might have inferred from this, had we been wiser, that no thing can withstand the action of a force without wasting under that force, while in the process some at least of the material substance vanishes without return. And so we are prepared to find later what is indeed the case, that even the human body, though very well made by the force of man-life for all the manifestations of man-life, wastes and must waste, when the force of man-life acts through it. and, of course, that waste must be made good by food. But this waste of the body stuff and the assimilation of food into the body to restore the waste are not, as in the fireplace of the steam engine, accompanied by any increase of heat, but these processes take place in the body at the temperature of the body by the action and power of man-life, which procreates the body and continues to dwell in it, in order that it may be enabled to act as the medium for the manifestation of all the phenomena of man-life. (God alone, the Source of all energy creates ; but energy which emanates from God procreates the universe ; and man-life, which is a variety of that energy, procreates the human body).

There are several very interesting if very profound questions, that occur to us in this connection. Physicists speak of pure force, *i.e.*, I suppose force acting apart from any intermediary, and not embodied in material substance. This is almost beyond human power to understand, the more so, as is said elsewhere, because some forms of matter are so subtle as to be indistinguishable by us from Spirit. But perhaps the body may not waste except in the act of doing

work? The mere act of living for a short period of time—I do not say for long, because the body rapidly deteriorates during idleness—may not necessarily waste the human body. There are some substances which, like oxygen, seem to act as the means of sustaining combustion, though not being themselves consumed, just as a bush on a certain occasion and in certain special circumstances might burn without being consumed; or, like the pure force of the physicists, might be a source of light and heat without being embodied in any material substance, that must waste as the light and heat are emitted. There may, perhaps, be a light and a fire that illuminate and warm by their intrinsic power, independently of material substance. As will be shewn later, the nervous system hardly wastes at all in a fasting body, and this fact may perhaps give us some glimmer of light by which to understand how a bush might burn without being consumed, or how there might be pure force without material embodiment. But fire or heat, without waste of the substance through which the heat or warmth is manifested, has ever seemed to be impossible to human reason, and for this and other reasons we never have been able to conceive of heat, except as accompanied by waste or consumption of the material through which the heat is manifested, and therefore have never, or hardly ever, seemingly been able to conceive of life being kept warm except by the ingestion and the waste of food, which we suppose to be the means by which the life heat is maintained.

It is, however, necessary to have clear ideas on this and other points, if we are to give good advice as to the management of the human body. If we have not, and if we do not understand the action of the body, our advice will be hurtful, as unfortunately it has been too often in the past and often is now. But for this practical consideration, I do not think I should have troubled the reader with considerations of this sort, or at least (since, from a speculative point of view, they are very interesting, and have always attracted a small number of minds in successive generations) I should have made my appeal not to the majority whose lives may be lengthened and made happier and more efficient by a proper understanding of these considerations, but only to

the few who might feel interested in speculative questions.

This question, however, of the relation of the energy of life to the human body, is of such intense practical importance and bears so directly and so universally on the duration of human life and on its efficiency and healthiness and happiness, that I am compelled to attempt to interest the general reader in what, if speculative on the one hand, is of such immense practical interest on the other. It did not seem to occur to scientific observers, nor does it seem to occur to us now, that life, being a variety of kinetic energy, is intrinsically or inherently warm, that it is warm by its nature. To see this seems to be repugnant to human reason and to human nature. Still more repugnant seems to be the inquiry *why* it is warm, and this repugnance seems to be the cause of the present extraordinary opinion held by almost all scientific men, that as fuel seems to be the cause of the heat of the fireplace of the steam engine, so food is the cause of the heat or warmth of the body. The scientific men hold this absurd view, but it is only right to say that it is not so much their science that is at fault (although it is so to some extent, as has been shewn), but rather their philosophy. I wish much that it was not necessary to use the word philosophy, for I knew well the contempt in which the practical man holds philosophy. Call a domain philosophical or metaphysical, and the practical man is at once off at a tangent. He will not listen any longer. But this action of his is a great mistake, and shews great blindness on his part, for he does not see that his own assumption or conclusion that each question and each case must be dealt with on its merits is also the adoption of a philosophy: nor does he see that in fact, and whether we like it or not, and whether we admit it or not, we are always in life bound to philosophise, and that we always do. If science is part of the domain of human nature so is philosophy. (So is religion, but, happily, I have not to deal with that). What is science? Is it not the observation of facts, the exposition of facts and the attempt to see the laws or nexus of facts? And what is philosophy? Is it not the explanation of facts, the attempt to decipher not only their laws but their meaning? Will any sensible man say that it is noble or suitable

to engage ourselves and our minds in the former, but that it is ignoble and unsuitable to engage in the latter? In truth, the explanation of facts is always more important than their observation or their exposition or the attempt to see or define their laws, although it is no doubt very important to be accurate both in our observations and in our expositions or descriptions of facts. Still, the philosophy of facts is always more important than their science.

In regard to the question before us, whether the heat of the body is dependent on the food, and the wrong analogy that, as we must have fuel burning in order to have heat in the fire, leading to the wholly erroneous advice that the more food we put into the body, the more efficiency and work we shall get out of it, I often wish that the electric machine had been invented earlier in human history. Had it been so, better analogies would have probably arisen to our minds as to the working of the human body and mechanical machines. Our electric machinery, for example, will not serve to convey the electric current or force unless it is in order, unless the connections are bright and free from rust. Contacts must be good, if the electric force or current is to run freely. And if disturbances exist, the engineer will first inquire where the connections are faulty, before he increases the current running in the machine. If he did the latter he would be apt to cause fusion of parts of the machine, which would, of course, render it less fit and not more fit for work. In this respect the analogy between the body and the electric machine is closer than it is between the body and the steam engine. Also it is easier to see that as the electric machine will not work unless the current is passing freely in it, so the animal body will not work unless some sort of animal life force is passing freely in it; nor will the human body act as an instrument of work unless the force of man life is passing along its parts.

And, of course, the more freely the current is passing, the better will be the action and the more efficient the work of the machine. Further (though this point is not usually appreciated), we can no more observe or isolate or come into relation with the force of man life, than we can observe or isolate the electric force, or indeed any other force.

Even if a man should be electrocuted, he would feel the effects of the electric force indeed ; but would not even then perceive the force itself.

We infer the existence of the force of gravitation from the motions of the heavenly and other bodies, of chemical forces from chemical phenomena, of the electric force from electric phenomena, and of life force from vital phenomena. And perhaps another help to understand the action of the human body, if the electric machine had been invented sooner, would have been the perception of the fact (and by and by the significance of it) that a wire conveying an electric current is warmer than a similar wire not conveying one. This fact might have helped us to understand bodily heat better than the cruder considerations suggested by the steam engine. If in answer to the question "what warms the wire?" we had replied "the electric current," it would have been more easily seen that the answer to the question "What warms the body?" ought to be "Why, the life force or current of the life-force, of course." And this answer would have shewn us also why the living body does not take the temperature of its surroundings either in arctic cold or in tropical heat, because the internal force of man-life regulates the body temperature in all conditions ; and this kind of inquiry would have made it less repugnant to us to see that the life force is intrinsically warm. We might also have seen that dogs, horses, elephants, cucumbers and men have all their own characteristic temperatures, through the indwelling life-forces which procreate and animate each. The religious mind sees further implicates from this kind of reflection ; but the mind of man is a mixture of science, philosophy, political and social action and religion ; and it is because these parts of his nature are not in harmony with one another that there is so much disorder in our world.

OTHER DIFFERENCES BETWEEN THE BODY AND A STEAM ENGINE.

We have thus seen that the body differs from a steam engine in being living while the steam engine is not, or at least that the body is more animate than the engine ; and

we have seen, secondly, that the maker or procreator of the body continues to live in it while the maker of the engine dwells apart; and, thirdly, that the heat of the body does not depend on the food, although the heat of the fireplace varies with the amount of fuel consumed.

Let us now look at some further facts shewing the difference between the body and the steam engine. Fourthly. Does fuel become part and parcel of the stove? Certainly not. It is consumed in the fireplace, but it does not enter into the composition or structure of the fireplace. But food must become part and parcel of the body; it must enter into the structure of the body before it is used. This is a very great difference.

Fifthly. Next, if the heat of the body depends on the food, how does it happen that palm oil and ground nut oil and sugar are freely produced in the tropics, while olive oil is abundantly produced in the warm temperate regions of the earth as food for man?

According to received doctrine, these foods are essentially heat-producing foods and their calorie-values, as they are termed, are set forth in many large volumes, written by scientific but unphilosophic men. A calorie is the quantity of heat required to raise a unit of substance, say a gram of water or of body stuff, through one degree C. in temperature. According to accepted doctrine, blubber and fats must be consumed in cold countries in order to maintain the body temperature. Fats are said to produce more calories than equal weights of any other foods. They are the best heat producers, it is said; and if they are chemically consumed in a laboratory, no doubt this is the case. But the body is a vital laboratory and not merely a chemical one; and the food which it consumes is not burned as it might be in a chemical laboratory with much elevation of the temperature, but is assimilated into the body at the temperature of the body. Now, as fats are the best heat producers, why should they be supplied by Nature in the tropics and warm temperate regions of the earth, when they cannot be required in the former, and scarcely at all in the latter? In the tropics, the heat often reaches 140°F. , 150°F. , 160°F. , and even occasionally as much as 180°F. What possible

use can there be for food-heat-producers to be ingested into the body, since the outside temperature is already 40° or 50° or 60° or even sometimes 80° F. higher than that of the body? And the same difficulty has to be faced, although not to the same extent as to the natural production of olive oil in warm temperate regions. One is compelled to ask what were our scientific men thinking about when they propounded to us views so absurd as this?

One should hardly say scientific men, for it is not their science only, or perhaps mainly, that is at fault. The facts about the temperature of the body and the temperatures of its varying environments are true enough, as are also the chemical formulae for fats and sugars. It is the interpretation of the facts, that is, it is the philosophy of them or the reasoning about them which is so unsound and foolish. Besides that, however, the analogy is wholly false, as has been shewn.

The heat of the fireplace, no doubt, rises by many hundreds of degrees when fuel is burned in it. It may rise by thousands of degrees. But who ever observed that the bodily heat rises to this extent, or to anything approaching to this extent, when food is being assimilated into the body? And if the body heat may rise by a degree or two when food is taken, it may also rise, and often does rise, by a similar amount if we work with the body, and do not eat at all. A better explanation surely is that all kinetic or active energy is warm, and that in the one case nutritional energy (tropho-dynamic) shews its presence by the liberation of heat; while in the other work-energy (erg-dynamic) shews its presence by the liberation of heat also, or by bringing to our notice the fact that the processes of life are warm.

Having pointed out these five great differences between the human body and the steam engine, I think I am justified in saying that there are far more and far greater differences between the two than there are likenesses.

Sixthly. I might have added another difference which is rather a subtle one. When scientific men (I mean general scientific men, not necessarily medical men) have seen the folly of putting too much food (or fuel as they consider it) into the body, they have often been so governed by their

wrong preconceptions that they have given wrong explanations why it is harmful to do so. A great scientific man has said that to do so is like making the engine fire so hot that it burns the flues away and renders them useless far sooner than ought to be the case. It is quite true that the bodily machine gets out of order and comes to an end much sooner than it ought to do if too much food is put into it; but it is because the tissues of the machinery become clogged and blocked by over-nutrition (much as a copper wire conveying an electric current has its molecular constitution so much altered that it becomes so disorganised as to be unfit and unable to convey the current any longer; or because like an India rubber tube kept in improper conditions or for too long a time, it breaks instead of stretching) and not because too much heat has been liberated that this happens. The tissues are not burned away by being overheated. On the contrary, it very often happens that the bodily heat is lowered by two and sometimes even three degrees F. when the body is overfed for a long time. And this fact is the one on which those advisers found who say that the best way to meet the condition is to feed well. It sounds plausible and reasonable to give such advice, as it agrees with public opinion and with the desire to gratify the appetite which is so powerful a motive in human nature. But it is wrong advice, and the proper way to look at and to treat the condition is by seeing that when a fire is not burning well and brightly, it is often because, although there is plenty of carbon, there is not sufficient draught to make a good fire. The proper course to take, therefore, is not to put more fuel on, but to put the poker in and, gently raising it, to increase the draught, so that in a while the fire will be much more active and warm.

The nutritional assimilation of food in the body takes place at the temperature of the body (which is maintained by the force of man-life inhabiting it) without any increase of heat through the ingestion of food. To think as the scientific authority did, is to fall into a fallacy like that formerly entertained, that because CO_2 was eliminated from the blood at the lungs, therefore the temperature of the blood there was higher than elsewhere in the body.

This was found to be untrue. The blood in the lungs is of the same temperature as it is elsewhere in the body. It is true, no doubt, that the fireplace where CO_2 is eliminated is the hottest part of the steam engine, but the analogy does not hold at all as to the lungs; and we have seen that the body-heat is often subnormal in these conditions.

But, notwithstanding this discovery and the correction of unsound thinking arising or existing, our ideas remain so crude that a very able scientific man can write in such a way about the analogy of the boiler flues to the bodily tissues. It is very strange.

Warming of the wires by the passing of the electric current, and the slow changes of molecular structure in wires when the current has passed along them for too long a time, changes which so disorganise the wires as actually to render them incapable of conveying the current any longer, offer a much closer analogy as to what occurs in the body by feeding it too much or too often. Still, the suggestion that the heat in the three machines is caused by chemico-dynamic in the steam engine, by electro-dynamic in the electric machine, by zoo-dynamic in the bodily machine and by anthropino-zoo-dynamic or the force of man-life in the human body, offers a more instructive analogy still as to the cause of the heat in all the machines; and to have seen this, would have kept our thinking clearer on this subject. The physicist, however, always seems to imagine that forces depend on things instead of seeing that it is quite as likely and even more likely that things depend on forces; and so he has kept going astray himself and leading others astray also. To suggest to him that perhaps neither do things generally cause forces, nor do forces generally cause things, but that forces and things are generally effects of a common cause, viz.: the action of the universal energy by which all things do consist—well, the scientific man is apt to call this metaphysics and to refuse to converse any longer. But, unfortunately, this attitude of mind being carried into the domain of physiology and pathology renders us incapable of seeing that perhaps neither are germs the cause of diseases, nor perhaps are diseases the causes of germs, but that perhaps diseases and germs may be effects of a com-

mon cause, viz. : mal-nutrition. Failure to see this leads to very serious and very practical difficulties and errors indeed, and has led the medical profession to give wrong advice to the people, as also, alas, to fail in our own persons to offer examples of greater longevity or of greater healthiness or efficiency than are shewn by the general public.

7. Another great difference between the human body and the steam engine comes into view when we see that the steam engine is essentially a machine invented and used for the production of heat, which is used for heating water and converting it into steam, which through its physical qualities can be converted into a medium for the conveyance of power. The body, on the other hand, is not a machine for producing heat at all. It is warm because the force that animates it is warm, as are all forms and varieties of kinetic energy like chemico-dynamic and electro-dynamic. Even hylo-dynamic or gravitation or the force of material substance may be seen to be so also, if we consider how the sudden stoppage of motion by collision between two solid bodies is accompanied by the liberation of heat. Moving air and moving water are also warmed through motion, and are warmer than when still, so that heat above that of the surrounding medium seems to be an invariable quality of kinetic energy. The cause of this motion seems to be invariably accompanied by the liberation of heat. Luminosity seems also to be an invariable or at least a very usual quality of kinetic energy, but this quality is not under consideration now, although the streaks of darting light seen in tropic seas, made by moving organic forms, brings it to our notice in suitable conditions. Still, it is as well to remember that the two chief qualities of kinetic energy are heat and light, warmth and luminosity. Still, the inference just drawn, that heat above that of the surrounding medium seems to be an invariable quality of kinetic energy, has been too rash, if we reflect that the force of man-life is active or kinetic enough in the tropics, although it is 30° or 40° or more degrees below that of the surrounding medium. What we ought to have inferred is that all kinetic energy is warm, and that it seems to act by virtue of its warmth, but that whether it is warmer than its surroundings or not is

immaterial. The inquirer into Nature will see something of the deepest importance here. I do not deal with it, because it falls rather into the province of the spiritual than of the medical adviser; but I am obliged to refer to it because, Nature being one, medical advice and spiritual must harmonise if each is sound and true to Nature. We might also see that all lights are luminous, although the light of a fire is less luminous than gas light, and that the electric light is less luminous than sun light. And yet one light might be so brilliant as to make a lesser light appear to be darkness; although each in its own place may have its sphere of usefulness.

8. That the steam engine is essentially a machine for producing heat, while the human body has no such purpose is evident from the considerations that have already come before us; and an eighth difference between the two may be added, viz.: that bodily heat must be maintained by an internal regulating force, because the variations in the temperature of the body are very slight. In fifty years' experience of the practice of medicine, I have never known the bodily temperature higher than 106°F . or lower than 92°F . I do not remember having observed a bodily temperature of 91°F ., though I have seen 92°F . often; and I do not remember any observation above 106°F ., although I may have seen 107°F . Other observers, I believe, have seen or may have seen variations rather wider than these. In fact, I understand that one remarkable case has been described in which the bodily temperature rose as high as 120°F ., but I have never seen anything approaching this myself.

Now if, whatever are the outer changes in environment, the bodily temperature does not as a rule vary more than say 14°F . between its highest record above and its lowest record below normal, it is reasonable to conclude that this comparative steadiness of temperature must be maintained by an internal regulating force. This internal regulating force appears to me to be the life force or the force of man-life. A great scientific man said, from a prominent place on a recent occasion, that there is no need to search the skies for a vital force, because "all biological reactions are

determined by physico-chemical laws—that is by molecular structure.” He said further :

“It is the business of an artist to create, but of the scientist to analyse and separate the elements of form and to verify them by partial syntheses ; and these physical and chemical categories—improperly called mechanical, seeing that they are self-active and self-constructive—we have to exhaust before we search the skies for a vital force.”

What an example of materialism ! As if the vital force might not at once procreate the molecules and account for the biological reactions !!

But suppose that the vital force determines the physico-chemical structures and laws, and suppose that it determines also molecular structures ? What then ? Is not this a possible explanation ? Equally possible as the one that says biological reactions (or vital reactions) are determined by molecular structures ? Obviously it is. There seem to be three possible explanations, and so far as I can see, only three, of the constant concomitance of two sets of experiences, forces and things, in this case biological reactions of life forces and physico-chemical laws or physico-chemical facts. First, the physico-chemical facts may determine the biological reactions, or, to put it more shortly, the things may determine the force and the physico-chemical reactions may determine life. This is the view of the leaders of science. But second, the biological reactions may determine the physico-chemical laws or facts. In other words, the force may determine the things. Life may determine its phenomena. Is this a less reasonable explanation than the former ? No ; it is just as reasonable, to say the least. In fact, I think it is more reasonable to believe that forces determine things, than to think with science (falsely so called) that things determine forces. But, third, there is another explanation possible, viz. : this, that biological reactions and physico-chemical laws or facts are not cause and effect of one another, but are each and all the effects of a common cause, viz. : the universal energy or the pan-dynamic or the mono-dynamic of the Kosmos. According to this view, life and vital phenomena are both effects of the one energy of the Kosmos, the pan-dynamic and the

mono-dynamic which emanates, has emanated and will emanate from the only source adequate to account for it. This third view, that life and vital phenomena are effects of a common cause, I venture to suggest as the true view, the comprehensive view, and at the same time the very simple view that we can take of the intricate Kosmos in which we find ourselves. When, therefore, the eminent scientific authority tells us that we have to exhaust physical and chemical categories and the self-acting and self-constructive categories falsely called mechanical before we search the skies for a vital force, I agree with him if he means that the force is near us, in our bodies and in the earth under our feet, and that we experience the effects of it every one of us in ourselves. But if he means, as I think he does, that in his opinion there is no evidence for the existence of a life force at all—well, I can only marvel how different observers, calmly contemplating what seem to be the same phenomena, can come to conclusions so different and even so opposed to one another.

Another scientific man of deserved eminence has said that life is definitely not a form of energy, but that life regulates energy. No doubt life regulates, or to some extent governs, physical, chemical and electric forces. But why may not varieties of energy, procreating bodily forces suitable for the manifestation of their many qualities—why should not forms or varieties of energy be more and more and still more regulating and self-regulating until they rise into states higher than are known to us, and even know as they are known? Is it not possible or even likely that energy of a rare or tenuous or subtle kind should procreate forms of matter suitable to be the medium of its conveyance, as ether is procreated in order that energy may act at a distance? And that subtle varieties of energy may procreate rarer and subtler forms of matter fit for their conveyance? Or might it not even be possible that energy may, like the pure force of the physicists, not require to embody itself at all? Why should there not be force acting without embodiment? Why, at least, should not the one energy which is the immediate cause of the universe, and consisting, as it comes from an infinite source,

of an infinite variety of classes, families, genera, species and varieties, embody or incarnate itself in a corresponding number of classes, families, genera, species and varieties, grosser and rarer of material forms, suitable each for the expression or manifestation of the corresponding energy? We see hylo-dynamic or the power of material substance embodying itself in clay, rocks, metals, stones, precious and other, in order to manifest itself. We see chemic energy embodying itself in acids and bases with their affinities or attractions for one another, and we infer with surprise even the existence of ions and electrons underlying these. We see aero-dynamic and hydro-dynamic, and hygro-dynamic embodying themselves in air and gases and in water and fluids, that we may have the opportunity of studying their qualities and getting to understand them a little. Why is ether introduced in order to convey power or energy to a distance? Or is it perhaps only a conception of ours, a limitation of our minds perhaps, which makes us think that it must be introduced in order that power may act at a distance? If power acts at all, why should distance make any difference? Because we are determined by space, must energy be so likewise? May not energy determine space as well as be determined by it?

And why may not the innumerable number of vegetable and animal forms, with their mutual attractions of sex, like the chemical affinities and the positive and negative of electro-dynamics, be introduced to embody some of the vast number of varying powers of what we call life? Why should not some of these varieties be self-governing or self-regulating? And why may it not be possible that, as there seem to be colours beyond our vision and sounds beyond our hearing powers both too low and too high to be heard by us, so beyond the organisms and organisations of plants and animals cognisable by our senses there may exist subtler and rarer material forms to embody subtler and rarer powers of knowing, willing and doing, that as much transcend our powers in these directions as the organisms of the higher animals transcend the lowly protozoa? Is it not likely, or at least possible, that powers not only of knowing, but of self-knowledge, that powers, not only of willing

but of acting as conscious units in a living and harmonious Kosmos, may demand and may procreate in consequence with the demand, forms in which they can be embodied ; of rarity tenuousness and subtlety corresponding with the knowing, ethical, spiritual and celestial faculties or powers that are aspiring for expression? Why should the higher forms of energy not be regulating and even self-regulating? Are not, in fact, these the ways in which the universe, as we know it, conducted?

And are not the two great and outstanding features of it, its two most extensive and far-flung laws, first that attraction or drawing together is the most wide-spread law in physics or hylo-dynamic? And second, that improvement through effort, and more or less unpleasantness or pain, or at least of learning to give up our own desires, is the method of improvement in what we call the living? Why may not the higher and highest varieties of energy be self-regulating, self-renewing, and in their desire for attaining even higher life ready to undergo unpleasantness and even pain for the sake of more efficient service in the Kosmos to which they belong, and to the conduct of which it is their privilege to be allowed to contribute?

I can see no reason why, if lower sorts of energy obey laws, higher forms of energy may not be a law unto themselves, and be self-knowing and self-regulating. And the eminent scientific authority has offered no proof of his statement that life is definitely not a form of energy or that it is barred from being so because it regulates itself.

THE BEHAVIOUR OF THE NERVOUS SYSTEM IN FASTING.

A rather remarkable fact ought to be mentioned here. The nervous system, or nervous systems, are introduced in the animal kingdom for the purpose of the government of the organism by itself or rather by the variety of life-force that makes it. This nervous matter has, of course, its own particular structure, its own particular cells and fibres with their peculiar shapes and characteristic connections. And of course they are, like other organic structures, subject to

the general laws of nutrition through digestion and the circulation of the blood and lymph. They ought, therefore, to waste as other structures in the body do if deprived of nutritive material or food. But it is rather a remarkable thing that when in fasting the body is deprived of nutritive material, and when all the parts of the body waste and must waste, the nervous system does not waste, or hardly does so at all. It is certainly remarkable that when all the fat of the body disappears in fasting, and when the muscles waste to the extent of 30 per cent. of their substance, and when the blood itself loses 17 per cent. of its substance, the nervous system scarcely wastes at all. Is this a suggestion to us that the subtle and rare qualities of the higher and highest powers may not require bodies of any kind whatever, however subtle and rare? Questions of this kind transcend sense, and perhaps transcend reason; and there is no time or space even if there were adequate power to deal with them here. But so far as they go, their consideration does not seem to justify the opinion that life is not a form of energy because it regulates energy.

Another way in which the force of man-life seems to regulate energy, as higher forms of life regulate lower forces, is the remarkable fact, the full meaning of which it is difficult to decipher, that when the circulation of the blood is supplied to the brain, its rate is changed from that of the circulation to that of the respiration. That is when the blood is supplied to the body, to the face, to the head, even to the membranes of the brain, it passes in at the rate of 60 or 70 or 80 pulsations to the minute; but when it is supplied to the brain-substances proper, the rate is changed or slowed down to 14 or 16 or 18 or 20 a minute. As I say, I find it very difficult to account for this change, more difficult to account for the reason of it than for the mechanism by which it is effected, for it seems to be done through the action of the sympathetic system of nerves, ganglia and numerous fibres of which are found where the internal carotid artery carrying the blood supply to the brain proper (as distinguished from the meninges or membranes of the brain) enters the skull. The reasons for this change of rate are difficult to decipher. But one reason (not realised,

I suppose, by the force of man-life, which yet seems to act as if it knows) may be to diminish or to prevent the danger of apoplexy which, if it occurs, of course destroys the efficacy of the mechanism.

And yet in spite of this, our wrong ideas about the analogy between the body and the steam engine lead us into conduct which renders apoplexy a far larger cause of illness and death than it need be. There were, for example, recorded 24,929 deaths from apoplexy in England and Wales for the year 1917. Of these, significantly, 13,483 occurred among females, and 11,435 among males. Evidently something in the habits of females exists to cause this excess of deaths from this cause, and there can be very little doubt that the cause is the too frequent feeding that goes on among women, and particularly their keeping up the failing and fainting powers of the female steam engine by the bread, cakes and sweets which they find so suitable for that purpose. If only we could throw aside these delusional analogies between the body and the steam engine, we might get rid of much of our apoplexy and much of our cancer, which is due mainly to the same causes. Nor is there any other way of diminishing or preventing these illnesses, since when they occur they are practically incurable. From cancer there died in 1917, in England and Wales, 23,013 women and 18,145 men. Not only is the main cause in general over-feeding through the dominance of the silly analogies between the body and the steam engine; but the kind and form of over-feeding through excess of bread, cakes and sweets rather than through meat and alcohol is obvious also. And when the realisation of some of the causes of our inefficiency and of the destruction of the well-arranged machinery of man-life is forced on us by considerations of this sort, it seems to me that it would be very much more to the purpose if our eminent scientific authorities would recommend us to change our point of view and to alter our conduct accordingly, than to follow the lines so popular with them of saying that there are a hundred organs in the body whose cells are not only useless but positively damaging to it.

Of course if there are, the chief function of the doctor,

so much more knowing that the life-force which procreates and maintains him, will be to cut them out, to excise, say the appendix, from the large intestine in case it should harbour germs. But if these organs are not useless or damaging, perhaps the function of the appendix may be by secreting a gelatinous fluid to moisten the contents of the large intestine and so to prevent constipation; while, perhaps, the function of the large intestine may be by affording a sac for the slow elimination of waste to prevent the diarrhoea which would ensue if the small intestine had been entrusted with the double office of absorbing nutritive material and of eliminating waste. If these things are so, perhaps excision of the appendix might tend to cause constipation, while excision of the large intestine might conceivably tend to produce diarrhoea as, in fact, we are told it does. So that the pagan philosopher and the pagan physician, who both said that Nature has made nothing in vain, may not have been far from the truth after all. As is obvious, such widely speculative differences of opinion must involve very marked practical differences when translated into conduct. This is the only, or the main reason for introducing them here.

If, for example, a national health bill is promoted by persons holding the one set of opinions, its provisions must necessarily be very different from what would have obtained had the bill been framed by persons holding the other and truer views.

The differences are sometimes spoken of as materialistic on the one hand, and idealistic on the other. This, however, is hardly a true division, because some forms of matter are so thin, rare and tenuous that it seems impossible to distinguish them from spirit. Still, the differences are so great and so striking that it seems as if it must be very unsafe to legislate on health matters at all until the differences are composed. But, indeed, as differences of opinion always have occurred and apparently always will occur, it is obviously unsafe to legislate, in the manner in which parliaments do legislate, in such domains at all.

Unfortunately, parliament hardly ever seems to contem-

plate persuasive legislation. The only methods it seems to contemplate or use, or at least the methods it much prefers to use, are compulsion by fine, distraint, imprisonment, penal servitude, and interference with family life. The outrageous tyranny of such methods does not seem to trouble it; but more amazing still is the astounding fact that the people, who boastfully call themselves free, are apparently quite willing to submit to it. Usually blinded by some bribe or benefit, which is offered to some section among them, they appear willing to abdicate the natural right of judgment and of conscience, and to surrender to an assembly, which first arrogantly assumes that it alone knows what is for the public benefit, and then proceeds to attempt to balance the conflicting interests of its various sections by appealing to the greed of the multitude. Many and varied anomalies are thus introduced into legislation, such as the substitution of the will of the majority, and too often of the greed of the majority, as the test of truth in place of the laws of nature, so that we have as one result the unconstitutional enfranchisement of our paupers, who are now able to vote their own subsidies and to keep up continual agitations for their increase. Another inconsistency introduced by recent legislation is the injustice of making equal representation go along with unequal taxation; and other anomalies have come into legislative being, whose general effect is to put the industrious, thrifty and self-restraining minority under the government of an idle, wasteful and greedy majority.

In matters of opinion, like the domain of health, no doubt the same methods will prevail. Compulsion will be substituted for persuasion; nay, already is so. We have apparently learned nothing from our ecclesiastical experiences. Although many non-conformists have now become so political that they have almost ceased to be religious, it was not originally because they objected to religion that the non-conformists opposed the established church, but because they opposed the views and opinions which the established church held on many points; and even then the controversies would probably never have gone beyond pious

opinion, if it had not been that the ecclesiastical and political authorities had inflicted civil disabilities on those who used their natural rights of judgment and conscience in accordance with the dictates of nature. The same most unsatisfactory methods are evidently to be introduced, in fact are introduced in medical affairs, as will appear further on in this essay; and they must be sanguine, indeed, who believe that a similar interference with medical opinion and the right of judgment which, when applied to religion, led to ecclesiastical dissent, will not, when applied to State medicine, lead to medical dissent. And just as has happened in ecclesiastical affairs, that some Christian sects have been so carried away by political wrangling and lust of power as almost or quite to have ceased to be religious, so the introduction of legally formulated and compulsory injunctions into medicine, with the consequent interference with family life, seems to be running the risk of making our medical methods so political and so partisan that they may cease to be sanitary and health-inducing.

It is, it seems to me, an uneasy if vague feeling of the inconsistency between men's professions of their love of freedom and the tyranny exercised both in life and in legislation, that has led to the widespread feeling among thoughtful people that parliamentary government no longer deserves their respect. If it were said that it has come into contempt, that would not be so wide of the mark as one would wish that it should be. The parliaments in all so-called constitutional countries should beware lest their constituents should have cause to say to them—you have betrayed to your parties and sectional interests the interests of the people whom you were elected to represent. To keep parties in office, apparently you are willing to say anything, to deny to-day what you said yesterday, and to be smilingly ready to deny to-morrow what you are saying to-day. It is a sorry pass for that system of government to have sunk to, from which a little time ago so much was hoped, and which in some ways seemed as good as the wit of man could devise. Unfortunately, it is apparently possible that the most promising form of government may be

degraded by ignoble passions, like covetousness, into the means not of elevating but of deteriorating the people, who are constantly having it suggested to them that it is much easier to vote for wages than to work for them. Of course, the people are themselves to blame if they fall under the temptation of following the advice of selfish political agitators, who whisper "ca' canny," otherwise get as much as you can for doing as little as possible, although in palliation it may be said that the ignorant may be excused if they succumb to it. Still, if after two generations of free education, the mass of the people can still be called ignorant, one may well ask of what value is the State education of which we boast so much, and are we getting value for our expenditure? And if not, what prospect is before us that we ever shall receive value for the expenditure, which the State is making so lavishly on education? The political assembly has enacted a minimum wage without stipulating for a minimum or any output, so following, indeed, their treatment of themselves, for, at the cost of the country, they have voted themselves salaries without stipulating for the performance of any duties in return for them. So flagrant is this fact that a considerable section of members of parliament are actually saying we will not come near your illustrious house, but we will draw our salaries just the same. When legislators sink to that level, what hope is there for the people whom they represent? Or is it to be wondered at if they follow in the footsteps of their representatives? But a painful and even inexplicable part of the situation is that both people and representatives are believed to be capable of better things, and that taken singly most of them would prefer to act honestly rather than dishonestly, and would even be willing to admit that although they seem in the mass willing to take all that they can get and do as little as possible in return, still, if appealed to singly, they would nearly all agree that it is more blessed to give than to receive. It is an amazing thing how man can have sunk so low. If it had been predicted some years ago that the state of affairs that we now see could have come into existence, the prediction would have been de-

clared to be false. Yet we find men who, in private life, we hope are capable of better things, saying in public that the only way to make the poor richer is to make the rich poorer, when in fact the only proper way for poor and rich to become richer (if they wish to be so) is to work better. It must surely be evident to all right thinking and reflecting minds that there is no hope for improvement in public welfare from parliamentary methods and trade union wranglings such as we see being carried on. Parliamentary methods of Government seem to be hopelessly breaking down before our eyes, and so far from needing to be extended ought to be swept away: in favour of that change of disposition whose fruits are not cantankerousness, grumblings, sectional antagonisms and demands for the dominance of an idle and avaricious, amusement loving, noisy sensual and selfish multitude, but are on the contrary offers of industry and service from one set of units to others, such as lead to peace and happiness and love, and to the establishment of human society on just and lasting foundations.

Society can never become stable and progressive through the pursuit of self-interest, enlightened or unenlightened, but can be rendered so only by the altruism that thinks not only of its own things but also of the things of others. Neither can the people obtain health, the first essential step to which is self-restraint, by putting themselves under the power of an official class, medical or political, who have offered no evidence that they understand health or the methods by which it is to be obtained and maintained: for that can be effected only by study of the laws of life and by adopting such conduct as will bring our ways of living into harmony with those laws. The ways of officials pushing into place and power will almost inevitably be opposed to the teachings of Nature, and even if with their mouths they should preach self-restraint as the way to health, (which at present they show little sign of doing) they will insidiously by their conduct advocate self-indulgence as the way to gain it. The legislators and ministers who set them

up being of that mind themselves, will find their own opinions consciously or unconsciously reflected by the officials whom they appoint.

CHAPTER II.

The Functions of Food in the Body. Misunderstandings on this subject a fruitful cause of Disease and Death.

CHAPTER II.

EPITOME.

(Page 51). Functions of Food. Misunderstanding about them. The strength of the body not due to food any more than its heat. The body does not really do work, but is the means by which work is done by the life-force. (Page 51). Fallacies of the conventional mode of considering the work of the body. Cells are not sensible, though they are the means of manifesting sensibility. Fibres are conductive through their physical constitution and also by their organic connections. Are for unity. The life-force uses physical constitution of fibres for its own ends. Fibres are means of expressing physiological function by joining cells to cells. Relations of cells, fibres and joined cells to kyticity, to conductivity and sensibility. (Page 52). The strength of the body the evidence of the indwelling life-force.

(Page 52). Do machines do work? Or are they the means of harnessing natural forces to do the work? (Page 52). Hylo-dynamic, chemico-dynamic, electro-dynamic, etc., really the efficient doers of work; not the physical, chemical or electrical qualities of matter. Brain obeys general laws of nutrition and secretes cerebral lymph as liver secretes bile. But to say that the brain secretes thought, a great fallacy. True analogy is that cerebral lymph is the mysterious means of conveying thought, as bile is the mysterious means of emulsifying fats, etc. Powers must not be degraded to level of things.

(Page 53). Do things make forces or do forces make things? or are forces and things effects of a common cause? viz., the pan-dynamic and the mono-dynamic by which all things do consist? Understanding this necessary if good advice for maintaining health is to be got because, in fact, the body is often made stronger and even heavier by diminishing food than by increasing it.

(Page 54). Understanding this question and acting properly would avoid much suffering. Authorities who do not understand do more harm than good. Compulsion not justifiable in matters of opinion. (Page 54). Far fewer evils from freedom than compulsion.

Example from a case of neurasthenia (page 54) and the opposite ways in which it is often treated. Feeding and restriction. (Page 55). A case of diphtheria and considerations arising out of it. Mother's refusal to let child go to infectious hospital. (Page 56). Heavily fined. Ought English law to allow one person to coerce another in matters of opinion? Doctors did not prove their case. (Page 56). Diphtheria not a very infectious disease. Why should mother be fined if she is ready to bear the risk rather than part with her child?

(Page 57). Force and fraud of legislatures. (Page 58). How a business might be closed and a family starved into submission. Doctors exaggerate dangers of infection and are converting people into cowards, like Lindley Earnshaw and Linton Heathcliffe. Care of health may be converted into a danger rather than a blessing. (Page 58). If we are infected or infectible is there no contributory negligence on our part? If so may we not render ourselves insusceptible to infectious and contagious disease by proper living?

(Page 59). Doctors should advise us how to do this. (Page 59). Are cases of infectious diseases necessarily caused by one another, or may they not arise from a general or common cause? Why may not succeeding cases be caused in the same way as the first? In view of possible contributory negligence, legislatures are too compulsory. (Page 59). Child ordered to infectious hospital for diphtheria may contract scarlet fever there. Danger of having too many hospitals and too many officials. Ought covetousness to be treated in greed institutes? (Page 60).

Are authorities justified in compelling citizens to pay for preventive means, when we believe they will be futile? (Page 60).

(Page 60). How infectious and contagious diseases may arise *de novo*.

(Page 60). Reasoning on infectious diseases in a very

unsatisfactory state. Ways in which infectious disease may arise (page 61) germs. Drops of shaving water with organic particles in them. Such particles alive (page 61). Might find their way into crack in mucous membrane and be a source of infection. Is perfect health attainable?

(Page 62). Rubbing skin dry after bath. Large quantity of epithelium rubbed off skin. Such epithelium alive, or at least very mobile.

(Page 62). Infectious diseases may arise *de novo*. Those who say they cannot, so inconsistent as to make us doubt if they really believe themselves what they say. The medical officer of health inquires into the milk supply if he has some cases of scarlatina reported in a morning. His inconsistency in both ordering changes to be made in the dairy arrangements and also holding that infectious disease cannot arise *de novo*. (Page 62). *Omne vivum e vivo*. But is not everything in Nature alive? Doctors ought to advise cleanliness in living so as to render us insusceptible to infection.

(Page 63). Influenza; the cause of—not absent from England for thirty years. Belongs to class of infectious fevers: associated with growth of micro-organisms.

(Page 64). Philosophy of relation between micro-organisms and disease. Disease may be associated with micro-organisms and yet not be caused by them. Illustration from relation between gravitation and matter. 1. Gravitation a force may be caused by matter a thing; 2nd, the force gravitation may introduce matter in order to demonstrate its presence and to shew that attraction is the widest spread force in the universe; and 3rd, gravitation and matter may be (page 64) concomitant effects of a common cause. So 1st, germs may cause disease; 2nd, disease may introduce the micro-organisms to cure them; and 3rd (page 64) germs and diseases may be co-ordinated effects of mal-nutrition. Diminution in fevers and consumption the chief improvement in health since Registrar General began to keep his figures in 1838. (Page 65). Improvement effected by paying attention to ventilation. Parkes's dictum about vitiated air. Why influenza has not diminished like infectious diseases and consumption.

(Page 65). Influenza cannot be caused by over-crowding, because it has attacked the over-crowded and the non-over-crowded, the poor and the rich alike. Too much bread the cause of influenza. Effects of too much bread. Colds and rheumatism, which have often preceded attacks of influenza. The connective tissues the dumping ground of the blood; affected in rheumatism and also in influenza (page 66). Influenza of late almost a pneumonic plague.

Causes of Respiratory Diseases. Respiratory diseases still, as in 1838, account for a quarter of total mortality—usually attributed to cold, wet, wind, etc. Convenient, but not rational to do so.

(Page 68). Function of respiration to carry off waste matters formed in digestion. We get cold because we give the respiratory system too much to do in compelling it to carry off too many waste products from overloaded digestive system. In 1838 we did not know that respiratory system is developed from digestive. Some excuse, therefore, then, for attributing respiratory diseases to cold.

(Page 68). Has life process any meaning in developing respiratory tract from digestive? Are there unnecessary organs in body? Arrogance of those who criticise the behaviour of the Natural forces which form them. (Page 68). The soliloquy of the life-force. Inserts respiratory tract as chimney carrying off waste products of digestion.

(Page 69). Mode of formation of lungs. We refuse to see meaning of action of life-force or to hear her saying that as time begins to be, so time may be no longer. (Page 69). Nature not limited by time if we are. We might have prevented our respiratory diseases by using our information. (Page 69). The great importance of this in adding to length and efficiency of life. Possible benefit almost incalculable because not only direct but also indirect.

(Page 70). Anticipatory introduction of lymph circulation by life-force. Acts as if it knows. Lymph spaces introduced where waste-matters are deposited so as to carry them off. Lymph spaces joined into ducts, which go to lymphatic glands in all parts, but specially in neck, arm-pits, groins, etc. Glands elaborate the lymph. Are purificatory or depurating; and also form an economic provision that

nothing shall be lost. (Page 71). Life force if unknowing, still anticipative. Lymph ducts join thoracic duct and so convey lymph into blood. (Page 71). Is purpose conscious or unconscious? Perhaps life-force acts under guidance of powers that do know? (Page 72). Body a harmonious whole, inhabiting a harmonious Kosmos. Meaning of this. At least life-force developes lungs from digestive tract, as a chimney, to carry off waste, and also introduces lymph spaces and lymph ducts in connective tissues. What nature means to shew us by these things? A disgrace that fifty years after this knowledge has been gained, one quarter of our mortality should still be due to respiratory affections. Preventability (page 73) of deaths from asthma. So far from being incurable, asthma is a very curable disease. Being dominated by the steam engine theory of the body, we do not offer such advice as would prevent and cure asthma. We do not understand nutrition: or perhaps are afraid of losing our employment. The very large numbers of deaths from pneumonia, bronchitis and consumption of the lungs. Even if consumption not amenable to the same considerations, still over 80,000 deaths might have been prevented in 1917, (page 73), by acting on our knowledge. Disgraceful that doctors should not offer advice, even if public do not want it. (Page 74). Respiration a function subsidiary to digestion. Nature attempting to show need of restraint upon appetite to prevent colds and also suppuration of glands in neck, etc. (Page 74). If men think they are out for a good time may they not have a better time through self-restraint than through self-indulgence, and so do better service to God and man? Better, by commanding ourselves, to live healthily, than to tax our fellows to provide us with houses, or with more wages for less work. What is the use of high wages if work is scanty? (Page 74). What is the good of yielding to pleasures of table if doing so gives us colds? or rheumatism and gout? They also, like colds, are preventible. (Page 75). The great importance of understanding nutrition, if we would prevent respiratory and rheumatic and gouty diseases, and so increase the length and efficiency of life.

The housing question. There is a shortage of houses, although opinions differ as to its causes. The war prevented house building, but also by killing so many men made fewer houses necessary. (Page 76). Some say that Finance Act, 1909, reduced building for some years before the war. Happily some of its provisions will probably be repealed because unworkable. The urgency of housing more sanitary with many than economic. Better health among the better housed (page 76). People living insanitarily in sanitary houses cannot expect to be well. Thriftlessness, carelessness, dissipation and wrong alimentation characterise persons living in insanitary houses, while persons living in better houses have usually better habits. (Page 76). Habits more important to health than houses. Therefore, providing better houses will not necessarily improve health, especially if they are provided at no effort by the residents or with too little effort, because we value things in proportion to their cost. Behaviour of bad tenants to houses (page 77). If people get things for nothing they generally value them at nothing. (Page 77). Besides, wages are so high that people are better able to provide their own houses than they have been for a long time. After a generation of free education they ought to be able to organise building schemes for themselves. If they did, the State might help them to own their own houses. (Page 77). But they will not be likely to value what they get for nothing or for less than its economic value, and what is the good of free education for a generation if it has not enabled the people to solve the housing problem for themselves? Besides (page 78), who is to have the houses? Why A, rather than B or C? Covetousness is still a characteristic of man. Why should poor rate-payers be compelled to build houses for other citizens little poorer than themselves, when there is no certainty that the houses will effect their purpose? May not an agitation arise to abolish rent? or may not persons part with their houses to their children or other relatives in collusion with them in order to get other houses for nothing? As in the case of some old age pensioners? (Page 78). Ought destitute poor, or paupers, to be enfranchised when they may start an agitation to

increase their pensions or to lower the age at which they shall be payable, voting themselves salaries without the inculcation of any corresponding duties? What if the pensioner demands £250 a year because he cannot live on less? And why should not the expectant mother be provided with a nurse and char-lady? And why not provide for the prospective father also out of the rates or taxes? Why not pay mothers and fathers £200 a year till the arrival of the child, and then raise the salary to £250? (Page 79). And if young persons schooled till 18 work hard till 21 years of age, why not then give them an old age pension of £400 a year, like legislators, that they may attend properly to football and cricket? Philanthropists (page 79) should see to it that their well meant proposals do not put the thrifty under the wasters, the industrious under the indolent, and the self-respecting under the vicious, and recreate the out-door pauper whom the 1834 reform of the poor law was meant to abolish. (Page 80). Should paupers be enfranchised? And if they are, may they not vote themselves better incomes for idling than the industrious one can get by working? Should those to whom duties are owed have the power of legally enacting their fulfilment? Is not voting other peoples' money into our pocket robbery? (Page 81). And does not giving this power do far more harm than good? Two propositions which, between them, nearly cover the ground in the housing question. Pigs in drawing rooms make pig-styes of them; and clean people in pig-styes will clean them out. (Page 81). Are politicians devoid of common sense? Or are they so warped by interest as to fail to see the virtues of the self-sacrificing few or to exaggerate the virtue of pleasure-seeking many? Further suggestions for self-restraint. Relation of mouth to digestive tract. Mouth developed with face. Face developed with head and with brain, the organ of will. (Page 81). Digestive tract ends at throat with pharynx. Mouth excavates from above; digestive tract from below. Distance between the two lessens till partition breaks down, and a through way is made, like the underground tunnel between France and Italy. (Page 82). Meaning of this. Take command of what goes into mouth. But (page 82) mouth

fed with hands; unlike beasts that perish, although sister powers to man-life make them. Should not remain blind to vision that attracts us upwards.

THE FUNCTIONS OF FOOD IN THE BODY. MISUNDER-
STANDINGS ON THIS SUBJECT A FRUITFUL CAUSE OF
DISEASE AND DEATH.

The heat of the body having thus been shewn to be dependent not on the food ingested into it but on the force of man-life procreating and inhabiting it, a very similar set of arguments and considerations will suffice to shew that the strength of the body does not depend on the food either.

The power to assimilate food, to convert food into blood and tissues, is obviously directly due to the force of man-life, for when that force departs at death, the body can no longer do either the work of assimilation or any other kind of work. Of course, on any proper view of things the body does not do any kind of work, but is the medium or instrument by means of which the life-force dwelling in it does any and every sort of work that man-life is capable of performing. The conventional mode of talking and writing is convenient and saves paraphrase, but is quite wrong. The same kind of fallacy is apt to mislead us when we say that an organic cell is sensible or a fibre conductive. The cell is not sensible; it is the life-force which is sensible. The fibre, no doubt, by virtue of its constitution is, like a wire or a cord, a means by which conduction from one thing to another may be effected, but when we speak of a fibre as conductive we mean something more than this, viz.: that it is used by the life-force as the means by which orders or sense-changes are conveyed from one cell to another, so that they may act in unity. The life-force uses the physical constitution of fibres (and other things) and directs them to its own ends, conscious or unconscious, realised or unrealised. We may, perhaps, say that the life-force uses the physical constitution of fibres to be the means of expressing physiological functions by joining cells to cells by means of them. If the fibre, therefore, in conductive, it is so because the life-force introduces it as the medium of conductivity, just

as it introduces the organic cell as the medium of kyticity, and as it introduces fibre-joined cells as the medium of sensibility. But to state this every time would involve the use of many words which it is not always convenient to use. Still, the caution should always be kept in mind, that the strength of the body is really the evidence (in all cases of work done, whether it be mechanical, nutritional, intellectual, emotional or spiritual) of the indwelling life-force. The reader might ask himself whether the conventional phrase that a machine does work is correct either, and whether we ought not rather to say that machines are made for the purpose (often enough unconscious in the mind of the inventor or unappreciated by him) of acting as the means by which the forces of Nature can be harnessed for work? In all cases it is really the natural forces, mechanical, chemical, electric, which do the work. The machines are only the instruments through which it is done. No great mental harm, perhaps, results when we speak of machines doing work rather than trouble to use each time the longer expression that machines are the medium through which work is done by natural forces. But it is obviously very different when we speak or write in the same way of the animal or human body. It may be as wrong intellectually and, no doubt, it is so, to attribute the work-power of machines to the physical qualities of matter rather than to hylo-dynamic, to attribute the heat of the fire to coal rather than to chemico-dynamic, or the work of the electric motor to the arrangements of the zinc, carbon and sulphuric acid, or to the machinery rather than to the passage of the electric current or electro-dynamic, without which no work would have been done—it is, no doubt, as wrong intellectually to say these things as it is to attribute the heat and power of the body to food and tissues. But the inconsistency is not so apparent, as it becomes when we assume that higher powers than the doing of mechanical work are due to physical causes or to organised structure. The brain, no doubt, like the liver, is an organ which obeys the general laws of nutrition, and which performs the function of secreting cerebral lymph, as the liver performs the function of secreting bile. But when we hear the striking but shocking

statement that the brain secretes thought as the liver secretes bile, what are we to say of the intellectual fog in which minds are, which venture to say such things? The brain, no doubt, secretes a clear spirituous cerebral lymph; and cerebral lymph in some unknown (and, perhaps, unknowable) way is the medium for the conveyance of thought and will, and, perhaps, also of emotion. To make the analogy apt, the statement ought to have been "the brain secretes thought as the liver secretes the emulsification of fats in digestion"; but to make the statement in that form would not have served the intended purpose of degrading spiritual powers to the level of material things. Bile, no doubt, is one of the means mysteriously used by the life-force for emulsifying fats, as the cerebral lymph is one of the means used by the same life-force mysteriously to convey thought; but to make a statement that the one organ secretes a power, and at the same time to imply that the other organ secretes the material by means of which a power is conveyed, shews such haziness of thinking, as is not very creditable to those who set up to instruct their more ignorant fellows. But since hazy thinking and the assumption of unsound analogies lead to conclusions so far away from truth, it is desirable to strive after clarity of reasoning in other directions also, even if in lower domains of Nature the effects of the wrong thinking are not so apparent. We ought, however, to make up our minds whether we think that things cause forces, or whether forces cause things; or whether, perhaps, the true explanation may not be that forces and things are effects of a common cause, viz.: the pan-dynamic and the mono-dynamic or the one universal infinite omnipotent and eternal energy by which according to accepted philosophy all things in the kosmos do consist. Without, however, considering the last results of such modes of thinking and talking, I am compelled to draw the reader's attention to the point, because if he thinks that the strength of the body is due to the food taken, he will be ready to accept the advice so often given to him that, in order to increase his strength, he ought to increase his food, whereas, in point of fact, the advice that he ought to diminish his diet in order to increase his strength (yes and not infrequently his weight also, incredible as this may seem)

is the advice that ought very often to be offered to him.

A proper understanding of the spheres of science, philosophy and spirituality, is no doubt of the utmost importance to man ; but it is for each to make up his mind on these points for himself, as he cannot be harmonious with himself unless he does so. If it were not for its practical importance to the health of the body and to the prevention of disease, however, and of suffering, I should not venture to refer to it. For the rest, it is the duty and the business of everyone as the evidence is presented to him in his experience of life, to be fully persuaded in his own mind. Of course, the body must be fed ; but if the sole function of food in the grown body is to restore its waste and is not to give strength and heat to it, it will obviously be most disastrous to empower politicians and medical experts, who believe the contrary, to attempt to compel the people to live after wrong methods. To do so will plainly do more harm than good.

And, incidentally, we ought to ask ourselves whether in matters of opinion, compulsion ought to be exercised at all, and whether in this particular case, in which opinions even among experts are so profoundly at variance, the time has come for compulsory legislation, even if we think it otherwise justifiable. For my part, I do not hesitate to say that I think that no free people ought to submit to have its freedom interfered with in matters of opinion. If this view should be declared extreme, it will be found that carrying it out, that is, that leaving people free to follow the dictates of their own judgment and their own conscience will entail far fewer evils, than attempts at compulsion.

As we shall better see the bearings of considerations of this kind from examples than from abstract discussion, I mention here a common instance or two. A young woman diagnosed by her doctor to be suffering from neurasthenia and from being generally run down, was recommended by him to feed up in order to cure the condition. She did so, taking as advised five or six daily meals, but did not improve ; on the contrary she seemed to get worse. Another doctor then told her that, whatever name might be given to her disease, the real state of things was that her body was thin, wasted and attenuated, because it was blocked with

too much food taken too often. The food, not having been assimilated, had blocked and attenuated the body. The second doctor said that the patient had got wrong advice, because her advisers held that the strength of the body and its heat depended on the food, as the heat of a fire depends on the combustion of coal. It may be stated that the patient's temperature was two degrees below natural. The second doctor recommended a very restricted diet of half a teacupful of milk filled up with boiling barley-water, to be taken at 8 and 11 a.m. and at 2, 5 and 8 p.m., and nothing else for a week. After that she was to have two small meals a day for a few days, and if not better was to go back for another week on to the restricted diet of milk and barley water. Under this treatment, continued for some time, and in spite of the protests of friends, who called it a starvation diet, the patient made a good recovery, the temperature after a time rising to natural and the general feeling of fatigue and malaise passing off, as well as the constipation from which she had suffered. In addition to this she gained weight. The rationale of the treatment was simple enough. It was that the body being blocked with too much food (taken mostly in nibbles, so small that the friends said she did not eat enough to keep a sparrow alive) could not act as a medium fit for the action of the life-force; but when the block was removed by the patient's taking for a time less food than was really necessary for the nutrition of the body, and when by this means the life-force, acting particularly through the lymphatic system, caused absorption and elimination of the waste, the patient recovered. Of course, it requires some courage, both on the part of the patient and the adviser, to continue such a course in spite of the protests of friends, who, no doubt, mean well—but, in many such cases, recovery takes place as it did in this one, although on the feeding up plan no improvement is experienced.

ANOTHER CASE.

Another case may be related here, more serious because it turns not on a difference of opinion between two advisers, which obviously may happen in any department of think-

ing and of consequent acting, and does happen in all, so much as on the permission by the law of England of persons holding one set of opinions to coerce others, because they hold different views. A child of four years of age has diphtheria. The doctor takes two swabs from the throat at two different times, and, finding the Klebs-Löffler bacillus present in both, diagnoses the case as one of diphtheria. On this opinion he recommends the mother to send the child to an infectious hospital, where, he says, the child can be better treated than at home, and also because, he says, that the child's condition is a danger to the community, since the disease may spread to others from the case. The mother, however, not wishing to part with the child, prefers to treat the little girl at home. In a fortnight the child is quite well in the mother's opinion; but the doctor, who has communicated with the medical officer of health, says that for another fortnight the child will still be a source of infection, and orders the child's removal to the infectious hospital. The mother still refuses to let her go, although the magistrate, who tries the case, advises her to obey; and when the mother still refuses, she is heavily fined.

Now this is a very serious state of affairs, because, apparently, the law of England allows a man who holds one view to coerce the mother of a little child, because she holds a different view. Ought that power to be given to anyone over others? Is it good legislation if it is, as it seems to be, good law? Let us look at it. The child seems well. No other case of diphtheria has been known to arise from it. The mother, who no doubt knows her child quite well, says she is in good health. If the child is infectious, as the doctors say, obviously they have not proved their case, because no other case has been shewn to have arisen from it. In fact diphtheria, while it is an infectious and contagious disease no doubt (contagious perhaps rather than infectious), is only very slightly infectious, and is much less so than, say, measles or smallpox. With very slight precautions, such, for example, as the prevention of prolonged contact from sleeping in the same bed as the patient night after night, or such as letting the diphtheritic patient cough some

of the grey fetid infectious stuff coming from the throat into the mouth of the attendant, there is very little danger of the disease spreading. And if the mother, knowing these things, prefers to take the risk of infection herself rather than send the child away where she cannot herself look after her, why should she be coerced, when perhaps the doctor's opinion may be wrong as to the danger of infection?

Even the youngest and most up-to-date doctors are not always infallible; nor is there any certainty that the opinions which are so jauntily enforced, and that with a high hand to-day, may not have been quite superseded in another generation. But yet in the meantime great interference has been made by the law with the liberty of the people. Good legislation ought to aim at preventing that. And I am foolish enough to think that good legislation is that which appeals rather to the judgment and conscience of citizens, than to their fear of infection (itself apt to be a cause of infection), and to fine, restraint, and imprisonment. That which appeals to the latter is bad, although, unfortunately, so compulsory and high handed is our legislature and our partisan politicians who dominate it, that they seem to act as if there were no other methods than force coupled with the fraud that always accompanies it, dressed up in the plausible form that legislatures and politicians alone know what the true interests of citizens are, and that we ourselves are incapable of judging in the matter. Do not many persons who seem to ail nothing go about with the Klebs-Löffler Bacillus in their throats and mouths? The scientific men themselves, who are most capable of making such a statement, have told us that they do. Why then the exercise of authority to interfere with family life in this way, and order the removal of the child to an infectious hospital, simply as a precautionary measure? It seems unjustifiable to do so.

There may be an excuse for persuasion. Many mothers, were all the circumstances put to them, would be persuaded to let a child go. If they are, well; but if not, is it not tyrannical to compel them and to fine them for not assenting? Had the mother been carrying on a grocery business,

the medical officer's order for removal would almost certainly have been submitted to, because he would probably have ordered the business to be closed ; and even if he had not, the panic that medical officers have succeeded in stirring up in the public mind as to infection would, no doubt, have re-inforced the order, and compelled it to be carried out. The family would have been starved into submission. Public opinion has become so scared about the risks of infection of late, that we are in danger of converting our people into Lindley Earnshaws and Linton Heathcliffes, who stay at home all day because there has been a shower of rain ; or even when they become so audacious as to be making love to a charming young woman, are at the same time so pusillanimous as to beg the nurse not to leave them. Surely, if health is so precious that it must not be risked in the labour and exposure required in order that we may do a service to our fellows, that sort of health is a poor boon. If it is to be used only in and for our own interest, should we not be as well without it ; or at least may we not be purchasing it at too high a price ? The insidiousness of selfishness may convert even the laudable desire to have good health into a damage rather than a blessing. But, however this may be, we may ask whether it is good legislation or good government to interfere with the means of a family, because we think that they are a danger to Society because a case of infectious disease has unfortunately occurred among them.

CONTRIBUTORY NEGLIGENCE.

It may even have to be asked : When we are infected, or if we are infected by an infectious disease, is there no contributory negligence on our own part ?

I must say that were I to find myself suffering from an infectious or contagious disease contracted say because my next door neighbour's child had diphtheria, or because he himself had influenza, or because I got barber's itch through being shaved at a certain place, I should be compelled to inquire whether there was not something unwholesome in my way of living, which rendered me so easily susceptible,

and whether, therefore, it would not be more reasonable to blame my own habits than my neighbour for my illness. Is there no means by which we may render ourselves insusceptible to the pestilence that stalketh in darkness and to the destruction that wasteth at noon day, so that if a thousand should fall at our feet or ten thousand at our right hand, it shall not come nigh us? And might not our doctors tell us what these means of living are, rather than be so ready to imprison and fine us when we fall ill? I know a family of children, who have been brought up to maturity without suffering from colds or from any infectious illness, by the simple means of eating twice a day only. Is it utopian to hope that an enquiry into the cause of disease on the view that it is due to violation of nutrition, may result in teaching us how to prevent and cure it? If coercion must be applied, what about the coercion, the self-restraint that each of us should be ready to put upon ourselves? Might we not have better health by a judicious use of this means? And will putting the blame on our neighbours be so likely to give us good health, as the attempt on our own part to obey the laws of life?

ARE THE CASES IN AN EPIDEMIC CAUSE AND EFFECT OF ONE ANOTHER, OR ARE THEY SUCCESSIVE EFFECTS OF A COMMON CAUSE?

Besides this, when case after case of an infectious disease like diphtheria or influenza occurs, is it certain that one case causes the next? May not each case be caused in the same way as the first case was caused? In an epidemic, may not successive or simultaneous cases be successive or simultaneous effects of a common cause, as well as cause and effect of one another? Why not? And, if so, where is the justification of our fining and punishing the relatives of the infected persons, when perhaps we are ourselves more to blame for so mismanaging ourselves as to be so susceptible? It seems to me that we are too compulsory in our legislation in matters of opinion like these. Before now it has occurred that a child removed compulsorily to an infectious hospital for one infectious disease has, while there, contracted an-

other; that a child removed because it had diphtheria has caught scarlet fever at the hospital. Are we to be compelled to erect at the public cost, in order to prevent this danger, special hospitals for each of the many forms of infectious diseases, for diphtheria, measles, scarlatina, typhus, typhoid, smallpox and the rest, each hospital properly staffed and equipped with all the latest appliances, for fear that a case should occur? Are there not already quite sufficient unoccupied, if charming and attractive officials about, without our proceeding to create more?

Evil habits are said to be contagious, and perhaps are so. Suppose they were to spread through the community, say greed of gain or covetousness, for example, among the generous and altruistic population of England, should we be more likely to succeed in exorcising the mischief by collecting all the covetous idolators into covetous hospitals or greed-institutes, than by attempting to alter the disposition to foster covetousness and to show up its evils? Apparently many modern legislators prefer the worse and more expensive to the better and cheaper way. There is no objection, except the futility of it, to their thinking as they like; but it is surely an unwarrantable interference with our liberty, when they proceed to carry out at our cost expensive schemes, which, although we know that they will and must be futile, we are compelled to contribute to.

HOW INFECTIOUS DISEASES MAY ARISE DE NOVO.

Thinking and reasoning about the whole question of the incidence of infectious disease is in a very unsatisfactory state. Those who say that each case of infectious disease must have arisen from a previous one, do not think it necessary to explain how the first case arose. Obviously it could not have arisen from a previous one, or it could not have been the first.

It does not appear to me to be difficult to account for a first case of the occurrence of a disease which, when started among a population, manifests contagious or infectious characters. It is said that there are no disease germs in so high a locality or in air so pure as is found, for instance, at

the top of Mont Blanc. Well, let us suppose that a healthy person went there to live. Of course, if unhealthy, as most of us are, he would carry his disease germs with him. But let us imagine that the person going there was perfectly healthy and had no disease germs in him. He would, of course, even there have to wash his hands, and so mix very small particles of epithelium with soap lather, a drop or two of which might fall say on a boarded floor. Or he might shave himself and let fall a drop of shaving water, soap, and short sections of hair and epithelium from the face. This might happen on several days in succession; and possibly the person might have forgotten, or might have been too much occupied otherwise, to clean up the spots. As they dried, a sort of fine powder would be left. This might be blown about by the air. If moisture from the air was mixed with the dry epithelial particles or with the fine dirt removed from under the nails, would not these particles move and heave under wetness and dryness and more warmth and less warmth in the weather? Of course they would. In their own way they would be alive, or at least susceptible of changes under altering conditions. Surely it is not impossible that fine dry dust of that kind, organic and inorganic mixed (though probably we ought to say more organic or less organic), might be inhaled, and, finding its way say into a minute crack in the respiratory mucous membrane, might set up a septic inflammation there which might spread to the whole body, furring or drying the patient's tongue and making his breath smell fetid, and rendering him a possible source of infection to everyone who should come so near him as to get the septic pneumonia from which he was suffering. We have to assume, of course, a certain amount of susceptibility, or even of unhealthiness, both in the person originally attacked and in the one who has been infected by him; but, in fact, this assumption is by no means a violent one, but is on the contrary one found all too often in life. One often wonders if perfect health is attainable? Perhaps not. But if it is, perfectly healthy persons may easily become unhealthy through wrong living, and may shed off particles in such an act as washing, to an extent beyond normal. Any person who may have resorted to the plan of

rubbing himself down with his hands without a towel after the morning bath must have been struck (especially the first time he did it) by the large amount of epithelial debris or surface-scale which peeled off his skin. One is inclined to ask if the scale is not more than it ought to be in perfect health. Obviously, however, these particles and flakes from the skin are organic and capable of swelling and shrinking, and of becoming more active and less active under the changes of moisture and dryness, warmth and cold, etc., to which they are subjected in the changes of the weather. But, even if it is difficult to say at what precise point perfect health begins to pass off into disease, surely it is possible for us to attain such a measure of health as to prevent us from being made ill by causes so slight as those suggested, or to be infected or infectible by our neighbours in such a way. However, as it is quite easy to see how infectious diseases may originate or arise *de novo*, as the expression is, the confident statement of those who tell us that every case of infectious disease must have arisen from a previous one becomes on consideration more and more doubtful. In fact, the able medical officer of health who makes the statement evidently does not himself believe it, for, in the same breath that he makes it, he adds that if he has twenty cases of scarlet fever reported in a morning he at once inquires into the milk supply, and sends an officer to see that the dairy conditions and the arrangements for the management of the cattle are in good order. If they are not, he prevents the dairyman from distributing milk, and orders the conditions to be put right. But if by doing so he shews, as he plainly does, that he believes that rectifying the arrangements will either prevent the cattle disease from occurring or will stop it if it has occurred, he evidently believes, that improper conditions cause infectious and contagious diseases to arise, and therefore he evidently does not believe that every infectious disease must have arisen from a previous one. If he is right in one of his contentions, as no doubt he is, he can not be right in both, for to believe that infectious illnesses are caused by improper conditions is evidently incompatible with the view that they cannot arise *de novo*. Every living thing comes from some other living thing it is said; *omne*

vivum e vivo. No doubt this is so ; but what or who formed the first living thing? And is not everything in Nature more living or less living? If in one sense epithelium flakes from the skin and dark powder from under the nails are dead, since they are the refuse of what has performed its functions in the body ; in another they are alive, and as we have seen they respond to heat and cold, to moisture and dryness, and other causes. But so do particles from rocks, and stones and clay and metals ; so that these also are alive in their own way and up to the measure of their capacity. From this point of view would not doctors be better employed in advising us to keep ourselves and our houses clean, than in scaring us about the danger of infection? And would it not be better if they advised us how to live so that even if our neighbours are not so clean as they ought to be, our risk of being infected may be reduced so as to be negligible?

TAKING TOO MUCH FOOD, AND PARTICULARLY TOO MUCH BREAD, THE CHIEF CAUSE OF INFLUENZA.

Perhaps this is as good a place as any, since we are considering the functions of food in the body, in which to say a word or two regarding Influenza. This disease has never been quite absent from this country since it re-appeared about 1889-1890. In former times it used to appear at intervals of thirty or forty years ; but for the last thirty years or so, although it has not always been equally extensive or equally severe, we have never been really rid of it. It belongs to the class of infectious febrile diseases, and is associated probably with the growth of a specific micro-organism. In fact, it is usually alleged to be caused by the activities of a micro-organism in the blood and tissues. But, of course, these propositions are not identical. A disease may be associated with the growth of a micro-organism or germ, and yet it may not be caused by the germ ; just as the force of gravitation may be always associated with the presence of material substance and yet not be caused by material substance. We often say that gravitation is a property of matter, which implies that we believe that the

thing causes the force. But this is not proved, because it is possible. 2nd, that gravitation, a power or force, introduces material substance in order to demonstrate its presence to our senses and to our reason, which might otherwise have been too dense to perceive that attraction or drawing together is the widest-spread or the farthest flung power of the material universe; and also too dense to see the meaning of such a fact, or whether it has any meaning at all. And, 3rd, it is possible that neither is gravitation a property of matter nor yet is matter a property of gravitation; for perhaps the true explanation is that gravitation and matter, the force and the thing, are not cause and effect of one another, but that on the other hand they are, both of them, concomitant or co-ordinate effects of a common cause, viz.: the universal energy, the pan-dynamic and the mono-dynamic, by which all things do consist. No doubt this is the true explanation.

And so in the case of infectious diseases. If they are associated (and always associated—which is doubtful) with the presence of micro-organisms, there are the same three explanations of the nexus open to us; for the germs (1st) may be (as is commonly assumed though without sufficient proof) the cause of the infectious disease. But (2nd) the disordered state of the body in infectious disease may produce the micro-organisms or make them arise in order to cure the diseases by eating up the pabulum of waste matters which form the nidus or soil suitable for the existence of the infectious diseases. This seems quite as good an explanation, if not a better explanation than the other, that the germ causes the infectious disease. But (3rd) probably neither are the germs the causes of the infectious diseases, nor are the infectious diseases the causes of the origination of the germs, but the germs and the infectious diseases are concomitant and co-ordinate effects of a cause common to them both, viz., mal-nutrition. This mal-nutrition arises through mis-management of the body, mainly through the prevalence of the foolish delusions regarding the analogies between the working of the body and the working of the steam-engine, whose consideration occupied us in the first part of this essay.

The chief improvement which has been effected in public and private health in the last fifty years has been the very considerable diminution effected in the incidence of the epidemic and infectious diseases, and in consumption of the lungs.

The epidemic diseases, Typhus, Typhoid, Smallpox, Scarlatina, Measles, etc., have been diminished by about a half, while consumption of the lungs has been reduced by about two thirds since 1838, when the Registrar General began to keep his figures. This great and very satisfactory reduction has been attributed to the attention that has been paid during that time to the need of free ventilation, and the evils of the absence of it, and the evils of overcrowding, etc. In fact, we have been hearing for fifty years now that the epidemic diseases and consumption of the lungs are preventible diseases, and that they are preventible by free ventilation and the absence of over-crowding which accompanies it.

This teaching is in accordance with the dictum of the hygienist Parkes, who said that of "all the causes of disease breathing bad or vitiated air is the chief." But, although in accordance with this dictum, much attention has been wisely paid to free ventilation and the prevention of overcrowding, the infectious diseases, among which must be classed Influenza, have not been prevented, although, as we have seen, their incidence has been very considerably reduced. Why is this, or how is it? Obviously, surely, because we have overlooked some of the causes of these diseases; obviously, because our ideas of their causation are too narrow. In view of this, ought we not to reconsider them? In the case of influenza, it cannot be overcrowding which is the chief cause of it, for the most widespread epidemics of it ever witnessed and the most fatal occurred in 1918 and 1919, when for over thirty years more attention had been paid to free ventilation and to the dangers of overcrowding than ever before in human history. Besides that, in our own country, millions of our men and women were away at the war, so that the overcrowding from this cause alone must have been appreciably less. Further than that, influenza has been as fatal among the rich, who are

more able to pay for free ventilation, as among the poor, who are less able to pay for it. The chief cause, therefore, cannot have been overcrowding.

I think there can be no doubt that the main and immediate cause of the severe epidemics of influenza recently experienced has been, because the people, stimulated by the well-meant efforts of our government to keep down the price of bread, have taken more of it than was necessary for the healthy nutrition of the body. As to the reasonableness of this opinion, let us remember that many persons took a good deal more bread than the nine ounces a day which was recommended or allowed by the food controller. But persons, who take as much bread even as nine ounces a day in addition to their other food, are apt to have sore throats and colds and rheumatism, which in so many cases have been the precursors of severe or fatal attacks of influenza. If waste accumulates in the body it is laid down (especially during rest and sleep) in the connective tissues of the body, which are the dumping ground of the blood; and so the person who puts more material into the blood in the form of food than is necessary for the nourishment of the body and the restoration of its waste, is apt to feel tired without adequate cause, and run down as he calls it, sometimes even before he begins work in the morning. Both men and women are apt to suffer in these ways, and when any fatigue or exposure to cold or wet weather occurs, or when any extra exertion has to be undergone, then they are apt to get an attack of influenza with or without the complication of pneumonia. No doubt it is in this way that our people (and all peoples, for it has been universal almost all over the world) have laid themselves open to the really fearful ravages of this disease, which affects the same tissues as rheumatism does (the connective tissues), and is often followed after recovery, or if it is recovered from, by the same effects on the heart as follow rheumatism. The pneumonia so often accompanying it and rendering it so fatal as really to make it sometimes seem as if it were a pneumonic plague, is quite simply accounted for. The excess of bread taken into the body compels the respiratory tract to have to eliminate far more CO_2 , ammonia and watery

vapour than the mucuous membrane is able to deal with. Hence the lungs become congested or inflamed, and too often the patient sinks from an attack of influenza complicated with pneumonia.

THE CAUSE OF RESPIRATORY DISEASES.

As I am referring to pneumonia as a complication and too often a fatal complication in influenza, it seems proper to add a few words about diseases of the respiratory tract. When the Registrar General began to keep his figures, the deaths from diseases of the respiratory organs (pneumonia, bronchitis, consumption, pleurisy, are the chief of these) accounted for about one quarter of the total mortality in England and Wales. The proportion to-day is no less; it is if anything rather greater, for I find that in 1917, the last year for which I have seen a return, the proportion of the whole mortality due to diseases of the respiratory organs was 28.3 per cent. These diseases, as is well known, are commonly attributed to exposure to cold, wet, wind, damp and so on, and these causes are frequently alleged to-day as they were in 1838. It is very convenient, no doubt, to be able to attribute the onset of diseases to the weather. In fact, it is a little difficult to think how we should get on without this excuse from which to account for our troubles. If the weather is cold and wet or frosty, we take cold. But if it is hot and stifling and dry and still, we take cold also, because the heat making us perspire, after we are exposed to the air we take cold. However convenient it may be to set up such excuses, it is not very wise or rational. If the respiratory tract is inserted by the life-force for the purpose of carrying off some of the waste products of digestion, the CO_2 , the watery vapour and the ammonia (NH_3) formed in the processes of assimilation, will not the lungs be likely to become congested and so, shall we not be likely to get bronchitis, asthma, pneumonia or consumption, if we give the respiratory tract too much to do by compelling it to get rid of more CO_2 , more watery vapour, more NH_3 and more waste products in general that it is capable of dealing with without distress? Surely, it is likely that this will occur.

And if in 1838 we had not discovered that such is the function of the respiratory tract, then there was some excuse for our suffering in these ways, and for allowing one quarter of our mortality to be due to this cause, although, excuse or no excuse, the laws of nature cannot be broken with impunity, and the consequences of breaking them fall on knowing and ignorant alike. There might have been at that time some excuse for attributing these diseases to the weather. But for about fifty years now we have known that the lungs are developed from the digestive tract. We might have asked ourselves what is the meaning of that ; or if it has any meaning at all? Of course, if the life-force has inserted, as we are told, a hundred unnecessary and even damaging organs in the body, it is hardly worth our while to inquire what her processes or methods of working are, and we can only regret that men so knowing and so critical of the imperfections of the body, were not consulted by Nature when she was amaking of man. No doubt they could have enabled her to avoid many blunders.

But if, as some men have said (Aristotle and Galen among them) that Nature has made nothing in vain, the case may be different, and it may be worth while to take a different attitude.

Listening them to the life-force, as she talked aloud to herself (although so many distinguished men say that there is no life-force at all) we overhear this soliloquy. "In the digestion of the higher animals a large number of waste products will be formed. What am I to do with them? It is very easy in low animal forms. When digestion was the simple embodiment of nutritious particles, similar in structure and composition to the body that was to be nourished, nothing more was needed than to form a depression in the body of the protozoon and to let the food particles be moved against it by water or other power, and so to have them incorporated in their structure. But it is very different now, when I have procreated more complicated animal forms ; and unless some steps are taken to get rid of the waste products in the higher animals, the bodies which I have taken so much trouble over so long a time to evolve, will be choked and blocked and will die long before they ought to. What am

I to do? Oh! I know what I shall do. I shall insert a chimney to carry off the waste products."

Thus she said, and to show us what she is doing, and why she does it, she inserts the chimney in the digestive tract itself, where the waste products are formed, in order that they may be carried away and do no harm.

But, although we have known now for about fifty years, that the lungs are formed by a little swelling appearing in the gullet very early in incubation, this swelling soon dividing into two parts, which by and by become the right and left lungs, we refuse to see what is the meaning of the anticipative provision of Nature, or the use we might make of it. For as she makes anticipative provision for respiration, which will not begin for nine months to come, we might hear her saying that the powers of life are not limited by time if we are; and we might also see how they, perhaps, suggest to us that there may probably come a period when time shall be no longer. But in practical affairs we seem to be as blind and deaf also as we are in philosophical and spiritual, for we still go on attributing our pneumonia, our bronchitis, our asthma, our consumption of the lungs to cold, rain, wind, etc., and fail to see that because we overload our digestions so that waste products are more and greater than the respiratory tract can cope with, therefore we have colds. And so we still allow our respiratory diseases to account for a quarter or more of our mortality, although by using the discovery of science, or perhaps, shall we say, the revelation made by Nature to scientific inquiry into her methods, we might have greatly diminished, or even perhaps have entirely abolished these causes of mortality.

How serious such a cause of mortality is will be more apparent if we reflect that if, by stopping or diminishing our respiratory mortality, we could succeed in adding even one year to life, our population of forty-five millions living in the United Kingdom would have forty-five million extra years of life to apply to good use in each generation. But, of course, we could do much more than this if we would. If we added five years to life on the average, our population of forty-five million people would add two hundred and twenty-five million years to healthier, happier, and more

efficient life in each generation. And how many million years of useful life we might add if, by getting all the benefit of our discovery, we entirely stopped the mortality from respiratory diseases, I really do not know, for I have not been able to calculate it. In addition to the direct increase to life, there would be much indirect increase also, because as we should be rid of the weakening effects caused by the occurrence of the respiratory diseases, no doubt we should be able to withstand the evil effects of many or even all other diseases such as rheumatism, apoplexy, diabetes, paralysis, etc., much better than we do now.

INFLUENZA OR PNEUMONIC PLAGUE.

Call it not Influenza—in despair—
An Influence dealing Deaths that sudden fall
And cover families as with a pall :
Call it Pneumonic Plague—and then prepare
What remedies most efficacious are
And what preventive ways of living shall
Render it harmless to the hurt of all
Who, had they kept the law, need have no care.
So shall Prevention render needless Cure,
For men who, suffering evils, fail and faint
Because they will not yield to self-restraint
To guard themselves from ills they must endure,
Like smoke through shaft ascending moves the breath ;
The lord of smoke and waste repels black death.

FURTHER ANTICIPATIVE PROVISION BY THE FORCE OF
MAN-LIFE FOR THE NEEDS OF THE BODY THROUGH
THE INSERTION OF THE LYMPH-CIRCULATION.

The method of instruction and action adopted by the life-force in other directions than the insertion of the lungs as a chimney to carry off the waste products of digestion, is in accordance also with her arrangements regarding the insertion of the lymph circulation. Knowing, or acting as if she knows that when the blood is loaded with, or when it contains nutritive material beyond the needs of the body, the blood will get rid of some of its incumbrance into the connective tissues of the body (those tissues that connect every part of the body with every other), foreseeing this or acting as if she foresees it, the life-force has silently and dramatically introduced into those same connective tissues the lymph-spaces and the commencing lymph-ducts. These spaces receive the lymph, which is separated from the blood in the connective tissues which form, as was foreseen by the life-force, the dumping ground of the blood. The lymph-spaces join up into ducts, which convey the lymph containing unused nutritive material from the blood into the lymphatic glands. These glands, though they exist in many parts of the body or even in all, are specially collected in groups in certain parts as the neck, the arm pits, the groins, where they can be felt and seen, and also in interior parts as the head, chest and abdomen, where investigation is required for their discovery. In these glands, so arranged in anticipation of the requirements of the blood, the separated lymph is elaborated, so that from being more or less watery before it entered them, it becomes more or less corpuscular when it leaves them. The ducts passing from the outside glands and from the inside glands, form an elaborate drainage system for the purification of the blood, and they also form an economic provision so that nothing shall be lost, even when, as was foreseen by the life-force (or if not foreseen was arranged for in anticipation) the blood might contain, under the stimulus of the appetite of the individual owning and inhabiting the body, more nutritive

material than was required. The corpusculated lymph thus elaborated through this perhaps unknowing but, if so, yet anticipative arrangement, is conveyed into a large-ish duct at the root of the neck, on the left side, made up by the junction of many smaller ones, and this duct in turn joins the thoracic duct. The thoracic duct contains the products of digestion, when food, after being acted upon by the teeth and saliva in the mouth, and by the gastric, intestinal, biliary and pancreatic juices, has been made ready for entering the blood current for the nutrition of the body, and of the parts which, as they have been used by the life-force for the purposes of life, have wasted under the use. That the thoracic duct should be joined by the great combined lymphatic duct, which drains most of the body, and that a smaller lymphatic duct, which conveys the drainage of the tissues on the right side of the head and neck, should by falling into veins be carried into the blood for re-use, is a plain if silent indication of the purpose intended to be subserved by the whole arrangement.

Is the purpose conscious or unconscious, the reader asks? Well! if not conscious it is anticipative of needs provided for before they arise, and it is adaptive to unborn requirements. What makes the adaptation? The force of man-life. Did the force of man-life know, or does it act by unconscious adaptation? Well, if it did not know of itself, for it is difficult to think that it was or is unconscious of things that require a little study and insight to discover, perhaps the explanation was or is, that the force of man-life acts under the guidance and direction of powers that are conscious and that do know?

At any rate the body is a harmony or a harmonious whole, no part of which can be interfered with, by being fostered either too much or too little, without disturbing the harmonious working of the whole.

The reader may, perhaps, join me in the reflection that the universe, which this harmonious and well-adapted body inhabits, is a harmonious Kosmos also; and may feel inclined to inquire how it happens that a harmonious body made apparently by the force of man-life, happens to live in a harmonious world and universe, and of what sort are the

forces by which the harmonious, or at least ordered Kosmos is conducted, and what is the character of the Source from which they spring? At any rate, the life-force develops the lungs from the digestive tract, apparently that the lungs may act as a chimney to carry off some of the waste products, which the life-force foresees will be formed there; and the life-force evolves or makes to arise the lymph-spaces and the lymph ducts in the connective tissues, which she again foresees (if unconsciously?) will form the natural dumping ground where any excess of nutritive material contained in the blood may be deposited. Nature may or may not have intended to say to us by the former arrangement, that we eat and drink our colds; but I think that that is one of the things which she does mean, and I think that it is a disgrace to us that fifty years after we have discovered that the lungs are developed from the digestive tract, it should still be true that over a quarter of all our deaths occur from diseases of the respiration. It seems so plain from the facts, that if we had not violated nutrition, either we should not have had any colds, or at least we should have had far fewer than we have. The practical use to which this discovery might have been turned will impress itself more evidently on us if we ask the question how many of the 2284 deaths, which occurred in 1917 from emphysema and asthma, might have been avoided if we had even for six months advised persons suffering from asthma not to eat say after two o'clock in the day? Following this simple advice has, in my experience, cured quite a large number of young asthmatics, and would be equally efficacious if offered by other advisers. In fact, it has been so powerful as a remedy, that I have come to the conclusion that, although asthma is often thought to be incurable, it is really one of the most tractable of diseases, and that in young persons we need not fear it at all.

That we do not offer this advice must, I suppose, be attributed to the fact, that we are so dominated by the steam-engine theory of the action of the body, that it may be truly said of us that we do not understand nutrition. Or, perhaps, we are afraid of losing our employment if we offer to the public advice which we instinctively feel that they do

not want?

Well, we ought to settle in our own minds the question whether the function of the medical adviser is to offer to people the advice we think they desire to have, or whether we ought not rather to advise them in such ways as not only to cure but to prevent their illnesses. If 2284 is a small proportion of deaths out of the half million or so of deaths which took place in England and Wales in 1917, we might reflect that 39,923 deaths occurred from pneumonia in that year, and 41,657 from bronchitis, without mentioning the 42,332 attributed to consumption of the lungs. Even if the consideration advanced as to asthma, that it is primarily due to indigestion and to over-loading of the body, does not apply to consumption of the lungs (though I believe it does), that consideration certainly does apply to bronchitis and pneumonia; and in view of this we can easily see the enormous importance to health and life, which proper views as to nutrition and feeding have on them, since by it we could have directly effected an alteration in 80,000 and more of the half million deaths that took place in 1917. And, of course, what is true for 1917, as for all the years dealt with by the Registrar General, is true for 1919, and will be true for 1920, and subsequent years. If by using the discoveries of science or to science, we might effect a great reduction in our sickness and mortality, is it not a disgrace to us if we do not do it? Or is it not at the very least a disgrace to the medical profession, that we do not offer the advice that we should restrict our diet, if we wish to reduce our colds, whether the public want that advice or not?

It seems also evident that by developing the lungs from the digestive tract Nature also incidentally meant to show us that respiration is a function subsidiary to digestion—which is, perhaps, putting the same lesson in a different way. Further, it seems to me, and I therefore suggest it to the reader, that while the development of the lungs from the digestive tract and the insertion of the lymph-spaces in the dumping ground of the blood both shew anticipative if unconscious plan or purpose, they both also point in another direction, for they seem to say that we ought to put some sort of restraint upon our appetites, since if we do not we

shall be liable to suffer from colds, and may die therefrom. And do they not also seem to say that it is necessary to restrict the input of our food for fear that if we do not we may find our bodies suffering from enlargement and suppuration of the glands adaptively introduced by the life-force in the neck and other parts, as an economic provision, so that nothing should be lost?

Does the reader say that he is out for a good time, and that he is not going to listen to suggestions of this kind?

Well! it is at his option to shut his ears if he will; but perhaps he will have a better time and a happier time, a time more efficient for service to man and God, if he begins by the exercise of some amount of self-restraint? It might be well, perhaps, to think of that? And, perhaps, it may also occur to us that it would be better and more to the purpose to strive to keep the body under, for efficiency, by getting command of ourselves, than by taxing our fellows to provide us with better and larger houses, and with more wages for doing less work? Perhaps, when we are wrangling about the larger share we want to have in the product of labour, the work of the country may be being left undone? And perhaps this, by diminishing the work we do, and the number of the things that we can exchange, may render more or less futile the increase of our wages; for what is the good of having high wages, if we have no work, or if we have not enough work?

And we may further ask—what is the good of yielding to the pleasures of the table, if doing so gives us colds, as by compelling the lungs to do more work than they are able to do we have seen that it does? And if by putting restraint on our appetites (for efficiency and not for asceticism) we might, as we have seen, much diminish or even prevent our respiratory diseases, is not the same inference to be drawn regarding those diseases, which shew themselves chiefly in congestion of the connective tissues, that large class of diseases termed rheumatic or gouty? Are not they also preventible by the same means? Congestion of the connective tissues or of the dumping ground of the blood is really at the basis of a very large number of our diseases. Probably all the inflammations of special organs in the body

are preceded by some amount of congestion of the connective tissues, but even the direct effects like neuralgia, joint affections, many heart-affections and gout form a very large number of our ailments. When we reflect that all of these exist because, under the stimulus of appetite, we have allowed more material to go into the blood through the mouth than is necessary for the nourishment of the body and the restoration of its waste, the problem of understanding nutrition and of managing it properly assumes larger and larger proportions.

And so, of course, does the necessity of putting restraint on ourselves, if we wish to have health, to live long and to be efficient while we do live. These considerations of the means by which Nature seems to be suggesting self-restraint to us arise directly out of the study of the functions of food in the body. No doubt they are deserving of more detailed examination, and may have to be referred to again. The body is, however, so harmoniously put together that study of any of its functions throws light on all the rest, so that it hardly matters in what order we consider them. Although afraid of wearying the reader by prolixity, I am still very anxious that we should be induced to consider what has so much interest for us, particularly as a proper view of the methods of action of the body and of the qualities of the life-force, which is its immediate pro-creator, ought to induce us to alter our conduct in such ways as to lengthen the duration of life and at the same time render it more efficient for the work which is the chief object of it.

THE HOUSING QUESTION: ITS EFFECTS ON HEALTH.

Before mentioning another fact or facts, however, which seem to point to what seem further suggestions of Nature to self-restraint, I should like to recur for a moment to the housing question, for there does seem to be a house shortage, although there is some difference of opinion as to what the chief cause of the shortage is. There are some who say, that this is not so much the war, which, if it prevented houses from being built, also unfortunately killed hundreds of thousands of men who used to occupy

them, and in that way must have rendered the urgency of increased housing accommodation less than it would have normally been. But some, whose opinions are worthy of consideration, say that the Finance Act of 1909 was a great deterrent to building operations, and had had the effect of preventing house-building for some years before the war. Happily, we may expect that some of the provisions of that Act, having been declared unworkable, will be repealed before long. At present, however, the demand for more housing accommodation is being urged rather on sanitary than on economic grounds. More housing accommodation will, it is said, lead to better health in the community. No doubt, other things being equal, it may be admitted that we may expect somewhat better health among the better housed than among the worse housed members of our population. But even if we could shew that a higher death rate is generally found among a population living in worse houses than among those living in better and larger ones, it would not follow that the chief cause of the lower sickness and mortality rate was the better housing. Obviously if persons live unhealthily in sanitary houses they cannot expect to be well; and there can be no doubt that thriftlessness, carelessness, dissipation, and wrong feeding generally characterise the habits of people living in worse houses, while those who live in better houses, especially if they own them themselves, have generally better habits and better ways of living, and so have better health.

No doubt habits of living are more potent causes of health and of disease, than are the kind of houses that a population lives in. It will not, therefore, necessarily follow that providing better houses will cause a reduction of the mortality or any appreciable reduction of sickness. Especially will this be so if we provide houses either for nothing or for less than their economic value, because it is a well known feature of human nature that it is very apt to value things in direct proportion to the difficulty it finds in acquiring them. It is rather weekly tenants than house owners who stuff broken window panes with rags, who tear off doors and window frames to make firewood, and convert baths into ash pits, or even overcrowd their houses by taking

in lodgers. And when, or if people are put into houses, which they are not paying for; or if they are, are paying less than they ought to be paying, it is almost, if not quite certain, that they will value them in proportion to what they pay. If they get them for nothing they will be apt to value them at nothing. Besides, as to the economic point, it is remarkable that the wages of the working classes have never in all our recent history been so high as they are now, when it is proposed to build houses for nothing or for less than their economic rent. They are far better able to pay for them themselves, than they ever were, or at least than they have been for some hundreds of years past. If they had any organising power after acquisition of free education, they would arrange for the building of their own houses. If they did, it might be worth the while of the State to contribute a proportion of the cost of such schemes, because the people value what they provide for themselves. But if they do not organise building schemes themselves, having first put some of the high wages they have been earning for years to their credit in Building Societies, who would, no doubt, advance the bulk of the cost at reasonable rates (assisted by the State, perhaps), if they have not done this, what likelihood is there that they will keep in a sanitary state houses provided for them without any effort on their part? Or, if so little result has accrued from free education for a generation, that it has not enabled the people to act for themselves, what likelihood is there that they will value and care for things or houses provided for them?

Besides that, if houses are provided at less than their cost, who is to have them? Why should Brown have a house rather than Robinson? Or why should Jones have his before either of the others? Do statesmen and sanitarians know so little of human nature as not to foresee these difficulties? When did it cease to be true that covetousness (which is idolatry) is one of the long array of evil thoughts, which proceed out of the heart of man? And will they proceed thence any the less, because we choose to ignore the fact?

Why should industrious citizens, ratepayers and taxpayers, many of them poor, be compelled to provide houses,

when there is no certainty that the houses will effect the improvement promised?

What is to prevent an agitation arising, once houses are provided, that the poor should have them for nothing? And what is there to prevent persons from parting with their houses, even if they do own them partially or wholly, in order to be able to claim houses for nothing? Have no claimants for old-age pensions divested themselves of their savings, handing them over to children in collusion with them, in order that they might take advantage of the law which was not made with that object? Or if the law did contemplate that object, why were not the citizens told beforehand what was intended? Ought such persons to remain enfranchised so that they can start an agitation for the increase of the pensions and the lowering of the age at which they shall be payable, or for lowering or abolishing rent? Why should the old age pensioners not do as their legislators have done—vote themselves salaries without any stipulation as to the duty to be done by those who receive them? And if the old age pensioners are not to receive £400 a year, the same as a legislator, what are we to say to them if they tell us that in these times it is quite impossible for a family to live on less than £250 a year, since that is the present proposal of the limit below which no self-respecting destitute poor can be expected to pay income tax. And the expectant mother—married or unmarried—what ought she to have? How beggarly is the proposed allowance of five shillings a week. Ought she not to be provided with a nurse and a char lady, whose duties shall be laid down by our municipal councillors in their spare hours, when not engaged with the details of lighting and street cleaning and paving and gas works and tram lines and other trifles? And why should not the father of the expected child be provided for also out of the rates or taxes? If the interests of prospective mothers are to be so tenderly cared for, why should the interests of fathers be neglected? Would not say £200 a year be a reasonable allowance for the prospective parents, until after the arrival of the child, when the £250 due to every family should become payable? At the same time it might be enacted that as children and

young people are to be educated and trained till they are eighteen years of age—then, if they work hard till the age of twenty-one years, it will be well to let them have an old age pension of say £400 a year, the same as legislators, in case that the interests of football and cricket should be neglected. Philanthropists, who promote legislation for the benefit of the poor at the cost of the well to do, and with the laudable intention of abolishing poverty, except as the consequence of indolence, ought to be very careful to see that such legislation cannot be perverted by idle and greedy persons into means for putting the thrifty under the government of the wasters, the industrious under the government of the indolent, and the self-respecting under the government of the vicious.

It is a very serious thing to interfere with the action of economic laws. Doing so is very apt to do more harm than good. The creation of the old age pensioner may really be, even if with the best intentions on the part of those who carried out the legislation, converted into a means of recreating the outdoor-pauper class, which it was the determined effort of the 1834 poor-law-reform movement to abolish. It certainly seems to be a very serious menace to the safety of the State that our paupers should be allowed to retain the franchise, while they are voting their own subsidy; or that persons occupying houses at less than economic rents, at the cost of the public, should be allowed to exercise the franchise either. It is quite possible for such persons to demand and to enforce by their votes, a better living than their industrious fellows are enabled to obtain by work. Are we to take it as a principle that citizens can demand a living irrespective of the services they render to the community among whom they live? The well to do have, no doubt, a duty to those who are less well to do, but while freely admitting this duty we may surely be allowed to inquire if the poor ought to have a legal right to exact it, and to ask whether if one class vote the means of another class into its own pockets, that is not robbery. and if the permission of such a state of things is not likely to do far more harm than good?

There are two propositions that may be made regarding

the housing question. Between them they nearly cover the whole ground, and we ought to keep them in mind ; first, if we put careless and slovenly people into drawing-rooms they will make pig-styes of them. And the second is that if clean people find themselves in pig-styes, they will at once proceed to clean them out. Are politicians alone blind to the statements of common sense ? Or is it partisanship and the desire for votes that blind them to the virtues of the self-sacrificing few and make them exaggerate the good qualities of the pleasure-seeking many ? Legislation on such lines has destroyed States before now, and may certainly do so again.

FURTHER NATURAL SUGGESTIONS FOR SELF-RESTRAINT.

The facts in development which I was about to cite as suggestions to us towards the inculcation of self-restraint on the part of Nature, are connected with the relation of the mouth to the digestive tract. Although the mouth is the ingress to the digestive tract, the mouth is not developed with that tract, but is developed with the face, the face in turn being developed with the head. The head, of course, is developed with the brain, which is the organ of the intellect, of the emotions and of the will.

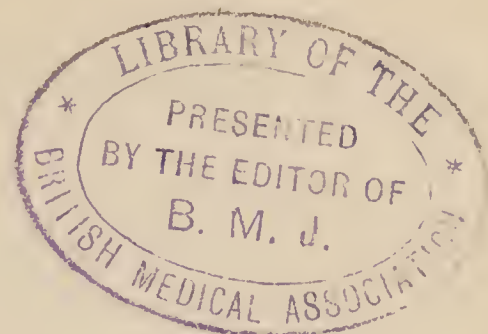
(The emotions may be largely connected with the viscera as the heart, liver and abdominal organs, and hence be more closely related to the functions of the sympathetic nerves than to the cerebro-spinal system. Hence we speak of affections of the heart, meaning the emotions—but, on the whole, I am assuming that the intellectual, emotional and volitional powers are developed along with the cerebro-spinal system of nerves. This is, however, too large a subject for consideration here, and I only refer to it).

To continue ; the digestive tract proper ends at the throat, or pharynx, as it is called, and in course of development the pharynx seems to aspire from below upwards, while the depression of the mouth seems to excavate from above downwards. (Up and down, it should be remembered, however, are terms applicable to the body in the erect position ; but in the curved or spiral position, assumed by the develop-

ing body, the terms upwards and downwards are not strictly applicable.) The distance between the excavating mouth and the aspiring pharynx gradually lessens and lessens as the embryo grows, the partition between the two getting thinner and thinner, till at length it breaks down, when there is a through way from the one to the other, and the mouth becomes the ingress to the digestive tract. It is like the process that occurred when the Mont Cenis tunnel was being made between France and Italy. When the partition became thin enough, so true was the engineering that the French workmen heard the sounds of the Italian picks and shovels, and the Italians heard the sound of the French ones. In course of time the partition was broken down, and there was a through way underground between the two countries. So it is that a through way is formed between the mouth and the digestive tract.

But as the mouth is formed with the brain, which is the organ of the intellect and of the will, does not this mean that the life-force is saying to us—take command of what goes into your mouth as well as what comes out of it? Let your mind govern the gratification even of your hunger, and keep your appetite under control.

So it seems ; but it does not end even there, because we do not put our mouth to the dish as the dog does, but, feeding our mouth with our hands, which are the messengers of the will, we have a higher responsibility and role than the beasts that perish, made though they are on models similar to ourselves, by the action of sister, if inferior, life-forces. And if they do not and seemingly cannot appreciate the lessons which the dumb but instructive voice of Nature is intent on teaching, let us at least beware lest we fail to respond to our opportunities, and remain blind to the vision of the higher life that is constantly attracting us upward through self-restraint to higher things.



CHAPTER III.

The Functions of Food in Children.

CHAPTER III.

EPITOME.

(Page 86). Functions of Food in children. Another function, to provide material for growth. Misapprehension on this point. How much does a child grow? At most half an ounce a day; and generally a quarter of an ounce. In first year half an ounce, at 10 years a quarter of an ounce. Effects of too much food. (Page 87). Adenoids, enlarged tonsils, measles, diphtheria, scarlet fever or bronchitis, etc., or suppurating glands of neck. Cause of increased bodily heat in inflammations and fevers, waste of body has to be made good by food. But assimilation performed at temperature of body through the indwelling life-force. (Page 87). Ill-made body stuff breaks down and is burned up, causing increased bodily heat. Unfit to convey life-force. (Page 87). Life-force unconsciously works to harmony and burns up ill-made body stuff. The increased heat, the friend of the body, by ridding it of harmful stuff. Works to life and not to death. We see the suffering too much and imagine Nature red in tooth and claw. Might we not have attained dominion over Nature better by better methods? (Page 88). Not necessary to destroy animals. In getting dominion over our own kind better results would have been better obtained by better methods. (Page 89). Fuller knowledge about floods, earthquakes and volcanic eruptions might alter our views, for we do not know everything. The pan-mono-dynamic is not only omnipotent, infinite and eternal, but also orderly, just, and producing a kosmos not a chaos, and is also merciful since law-breaking men have not been swept away. Also (page 89) our evils are not cumulative; and when they are so and sweep a strain away, this also is merciful since it prevents infecting the whole. Our efforts too often directed to combating effects of law

breaking, whilst we should study Nature's laws and strive to keep them. Better try to prevent fevers than to mitigate them. (Page 90). Prophylactic packets will not prevent evils arising from licentiousness. Nature will pursue her methods of destroying infected strains in three or four generations. Consequences of evil, evil always; of good, good always. We are offended when children suffer from evil conduct of parents, but complacent when they benefit by parents' well-doing; but one no more unjust than the other. (Page 91). Impossible to break Nature's laws with impunity. Even if not a moral, this is a practical consideration. Is it because we wish to avoid self-restraint for ourselves and our children, that we refuse to see the truth? (Page 91). Freedom from the crude analogies about the steam engine would enable us to see the truth better (page 91), and to have better health. The intermittent action of the life-force. A child does not grow steadily, but intermittently. (Page 92). Growth is like mounting stairs in little and irregular flights. Movement is succeeded by pause and pause by movement; but we are surprised to find that growth is often succeeded by loss of weight before renewal of growth. All movement seems to be intermittent, not continuous. Rise and fall of tide and children's growth similar. Even the movements of the heavenly bodies better represented by ellipses bounded by little spirals than by ellipses within continuous lines. (Page 93). Things must always wince and waste when forces work through them. The tides rise and fall, but keep rising; or fall and rise but keep falling; and the heavenly bodies behave in the same way, rotating on their axes as they revolve in their orbits. Growing children seem to obey a similar law which governs commercial, social, political, ethical and spiritual phenomena. To effect this intermittent action the life-force introduces longitudinal and transverse elements. Analogies of this kind applied to the Kosmos take us outside of our powers, for we have no means of measuring the possible movements. (Page 94). But if we had we might have to express them in spirals also. The wasting in Nature so slow as to make things seem to be eternal. But growth in children seems to follow same law as the harmonious universe.

THE FUNCTIONS OF FOOD IN CHILDREN.

In the case of children, no doubt food has another function, viz.: to provide material for the growth and increase of the body. It is necessary to say a few words about this, because so much misapprehension exists on this point. Those who tell us, and with truth, that a growing child must be well fed, do not seem to have brought clearness or accuracy to bear on their consideration of the question of the feeding either of children or of adults. As to children it would be interesting to inquire how much a growing child grows ; and perhaps enquirers will be surprised to hear that, even when a child is growing at its most rapid rate, viz.: in the first year of life, the growth is only half an ounce a day, and that at later ages of childhood, the growth is only a quarter of an ounce a day or even less. A baby that weighs 7 lbs. at birth will weigh say 20 lbs. when it is a year old. That is, it grows say 12 or 13 lbs. in the first year of life. That is about a pound a month, or say 15 or 16 ounces in 30 days, that is about half an ounce a day. At 10 years of age a child will grow from 4 to 6 lbs. a year, that is about a quarter of an ounce a day. But if in excess of zeal, or acting with unwise solicitude and love of the child, the mother or nurse provides the child with more food than is required for its nutrition and for the needs of its growth, what is likely to happen? The mother and nurse are very anxious to do well by the child. But if in response to the natural and proper reflection that the growing child should be well fed, the child is supplied not only with a sufficiency of food to restore the waste caused in the tissues by the action of the life-force through them, and also with the ounce, or perhaps two ounces, extra daily food required for the child's growth—if when these two requirements have been met, more food still is supplied, what is the body to do with it? If instead of an extra ounce, or perhaps two ounces, of food required, the child is supplied with say half a pound of food or even a quarter of a pound extra, three times a day, why should the mother or the father be surprised if the life-force lays down some of the excess of food-

material in the glands in the back part of the mouth and nose, so causing adenoids, or enlarges the tonsils, so that the doctor says that they must be removed? Or is there any cause for surprise if children so treated should have measles or diphtheria or scarlet fever? Or if they should have bronchitis or pneumonia or typhoid fever, or enlargement and suppuration of the glands of the neck? Although these conditions are nearly always accompanied by increased temperature and by wasting of the tissues, so that loss of bodily substance is an invariable accompaniment of them, the increased heat is not caused directly by the combustion of the excess of food taken into the body as extra combustion of coal increases the heat of the fire. The increase of bodily heat is not caused so simply or crudely as that, for food must first be converted into body-stuff—it must first be converted into blood and tissue, before it can be used in the body. In normal circumstances when, through the digestive processes, food has been converted into sound and healthy body-stuff, no doubt that body-stuff wastes somewhat when the life-force acts through it to perform the duties and do the work of life; and that waste has to be made good again in course of time by food. The necessary changes are performed at the temperature of the body through the action of the life-force. But when through mal-nutrition (and chiefly through over-nutrition) the change of food into bodily stuff has been imperfectly effected, and when therefore the body-stuff is not normal and sound and healthy, but is abnormal and unsound and ill-made and un-healthy, it cannot act as a proper medium for the conveyance of the life-force, and so it breaks down, and in doing so is burned up; and it is in this way that the elevation of temperature observed in fevers is brought about. It is not the food which is being burned, as coal is burned in a fire-place, that is the cause of the increased heat observed in fevers and in specific diseases like pulmonary consumption. No. But it is the ill-made body-stuff which, found by the life-force to be unfit for conveying the life-force, is broken down under the action, and being burned up, causes the elevation of the temperature. The life-force itself proceeds (unconsciously working towards the improvement and harmony and even

the, perhaps? unattainable perfection of life) to burn up the ill-made body-stuff; and the liberation of heat so effected is the cause of the elevation of the temperature (and the quickening of the pulse rate) of the body. The elevation of the temperature, the fever or fervescence (*ferveo*=I burn) of the bodily processes accompanying the burning of the tissues and amounting to a few degrees, say 4° to 6° Fahrenheit, is really therefore the friend of the body, because it is the means of ridding it of material which is unfit to be the means of conveying the life-force. The life-force, therefore, acting, if unconsciously, towards harmony, and not towards destruction, towards life and not towards death, burns up the ill-made stuff in order to restore the body to health. We, however, unfortunately but mainly through our perverted misunderstandings of the working of the bodily machine, concentrate our attention so much on the fever, the disturbance and the accompanying suffering, that we seem to be unable to see anything else.

And as we seem to see war and conflict and suffering going on in Nature, and that man has come to be what he is through a similar sort of conflict and through getting the better by craft over less crafty though often stronger animals, and too often over animals of his own kind through indulgence in ambition, cruelty and self-seeking, we have seemed to see justification in Nature for this kind of conduct. So much has this been the case that even a great poet describes Nature (if reluctantly) as red in tooth and claw. But we might have inquired whether we might not have been able to attain and to retain dominion over the lower animals by better methods, and if we might not have done so even more effectually than is the case now, when our success seems to mean their destruction. Further, as regards our own kind, it is certainly open to question whether the means by which we have obtained mastery over them have justified the objects in view. Certainly wars seem to shew no sign of abatement by war; and we might fairly inquire whether the proper objects of ambition, such being chiefly the influence which good will and good conduct would have had over our fellows, would not have been better obtained by better methods. Even if man has attained a certain position

and a certain success, the question remains if he might not have obtained both better by more worthy methods.

As regards physical Nature, we do not know everything, and it is quite possible that fuller knowledge as to floods, earthquakes and volcanic eruptions, especially if the knowledge is animated by good will and tempered by humility may bring with it different conclusions. When we come to examine the methods of its working, the pan-dynamic and the mono-dynamic of the universe, the universal energy by which all things consist, is found to possess more qualities than the infinity, omnipotence and eternity generally attributed to it. For it is orderly, it is just, since its law cannot be broken with impunity; and we must be blind indeed if we do not also see that it produces a Kosmos not a chaos, a harmony not a disorder. Still blinder must we be if we do not see that it acts mercifully also. Although breakage of the laws of life is worthy of death, and although we have broken these laws generation after generation after generation, since ever we have been on this planet, we have not been swept away from off the earth, but still survive upon it. Even in the illnesses which, mostly through our own folly, we have brought on ourselves, we have not sustained the full penalty, since we have oftener recovered than died. Neither have our evils been cumulative and hereditary, for the most part, although on the merits of the case they might justly have been so. And in the cases of diseases which, as they affect children early and interfere with the development of sense organs and limbs, so that strains so affected seldom survive for more than three or four generations, it is evidently merciful that this should occur, since if it did not, the whole human race would be infected and destroyed. *Our* remedial efforts on the other hand, as distinguished from those of Nature, are apt to be palliative rather than curative or truly preventive. And the aims of our parliaments and of ourselves are too often directed to combating the effects of breaking the laws of Nature rather than to inquiring what the laws are and making humble and penitent efforts to obey them. We seem to concentrate our attention on efforts to reduce the virulence of fevers—efforts valuable in their way, of course—rather than, by

advising the people how to manage themselves and their children, to render the fevers unnecessary.

And in other cases we have even gone further than this, for we actually propose to provide at the public cost, apparatus by which we hope to enable self-indulgent people to gratify evil and degrading passions without fear of consequences. It is certain that these efforts are doomed to failure. Not even the provision of prophylactic packets can obviate the effects of licentiousness, as the history of humanity down the ages might have taught us, if we had been willing to learn the lesson. For one reason or another they will fail; either they will not be used soon enough or something else will interfere with their efficacy; and we shall find that the only way to prevent such diseases is to abstain from the practices which induce them. If we do not, Nature will pursue, quite indifferent to our protests, her own on the whole merciful plan of sweeping off infected strains in three or four generations. If one of the reasons for adopting such immoral measures for preventing these diseases is the unquestionable fact that the innocent suffer with the guilty, is not the proper explanation of this apparent injustice this, that the consequences of evil are evil to all who are connected with it, and that this law of Nature cannot be broken? Besides this, the objection is met by the counter-vailing consideration, that the effects of good are good, not only to those who do the good but to all connected with them, even if they have not participated in the doing of the good actions. We seem to take it as a matter of course that the children of well-behaved and industrious parents should participate in the good results of their parents' conduct; but it is obviously no more just that they should do so, than that the children of thriftless or immoral persons should suffer along with their parents. They have as little deserved to participate in their parents' happiness as the others to share in their misery. While the perception that the law of nature is that the effects of evil are evil always, generation after generation, ought not to prevent us from doing what we can to obviate the effects of the evil, still it is perfectly obvious that no provisions for enabling persons to break the laws of Nature can be successful; for even if

they succeed in obviating one set of evils they bring on others, as for instance lowering the moral tone of those who have recourse to them. But probably the argument which will most appeal to the average man, is the fact that such measures fail in their purpose and have to be given up; as also that it is unjust to compel citizens to contribute to the provision of means of doing things which they think immoral.

How is it that the bearings of considerations like these seem to have so little effect on humanity? How is it that in the question of feeding our children or ourselves, we are so blind as not to see the truth, but that we plausibly buttress our conduct up with false analogies about the heat of the body and the heat of the fire-place? Is it because of this? that if we did ask ourselves how or why the overfeeding of the child caused it to have measles or pneumonia, and if the natural common sense answer arose in our mind, it would follow that we should have to put restraint on our children's natural inclinations and on our own? And as we have made up our minds to have a good time (albeit, we should have a better time by adopting better plans) and as we are determined to pursue happiness and to avoid self-restraint, even for efficiency, we do not wish for self-restraint; and so we either avoid the question or do not return the proper answer, if it does force itself upon us. Nevertheless it seems certain that if we were to throw away the too crude analogies between the human body and the steam-engine; if we were to see that the body is not a machine for the production of heat; if we were to see that neither the strength of the body nor its heat depends on the food; if we were to see that the sole function of food in the grown body is to restore its waste, and that even in the case of children the increase of growth is much less than we supposed; and if we altered our conduct, so as to make it accord with our changed views, we should no doubt have much better health than we now have and much less suffering.

ON THE INTERMITTENT ACTION OF THE LIFE-FORCE.

One of the facts about children's growth, which was a great surprise to me when first I observed it, I am constrained to mention here because it seems to have a bearing on the action of energy in general, of which the force of man-life is one of the varieties. In this particular, organic action seems to agree with inorganic, animate action with inanimate (so-called). A child does not grow steadily. He may grow 6lbs in one year, but he does not grow half a pound a month. More likely is it that he will be stationary for a week or two, then grow by a pound or less, and then again the weight may remain stationary for a time. It is as if one were mounting stairs which existed in little flights of two or three steps, with landing places, on which the growing child rests from time to time. And the flights are irregular. Some consist of two steps; some of three; some of four; and some of two and a half or three and a quarter and so on. The child in its growth reaches these various levels or flights, and there stays for a while before growing a little more. So far perhaps things go on as might have been expected, because what seems to be continuous movement in nature is really intermittent and not continuous, being made of movement succeeded by pause and pause succeeded by movement.

But what *was* a surprise to me when my attention was first directed to it, is the fact that not seldom does the child actually lose a little weight after gaining it. It goes down so to say, a step or half a step or a quarter of a step; it loses a fraction of a pound in weight before beginning to grow again. How is this? Can it be explained? Well! is not all action, even all motion, intermittent? Is not all advance really an advance and a recession, and another advance and another recession, in which, however, as the advance is greater than the recession, we speak of the combined movement as one of advance? Does not the tide rise in this way with a rise and a fall, the rise, however, preponderating over the fall, so that we speak of the tide as rising or flowing? And similarly when the tide is ebbing, there is ebb

and flow, alternate fall and rise ; but as on the whole there is more fall than rise, we say the tide is ebbing. Even the elliptic motion of the heavenly bodies should probably be represented not as ellipses bounded by continuous lines ; but the contours would probably be better represented by a series of small spirals, which on the whole followed elliptical

courses. Not thus  ; but thus 

What the precise and ultimate reason for this intermittence may be it is difficult to say ; but it seems to me to be due to the fact that no thing can withstand the action of a force or be the means or medium of conveying it without wasting or, so to say, wincing under its action, and requiring a certain (or uncertain) amount of time to recover before being ready to act again as the means of conveying or conducting the force and expressing the effects of it. The water that is the means of expressing the action of gravity in what we call the tides rises under the action of gravitation, and then falls a little in order to gain power to respond to gravity again. The heavenly bodies in their courses round their primaries behave in the same way ; they respond to gravitation, not only in their onward movements in their orbits, but they rotate on their axes, as they move in their orbits, responding to the same force. These courses would probably be a little more nearly represented by a series of little spirals pursuing on the whole an elliptical course than by elliptical forms.

And so with the growing child ; he grows under the action of the life-force, and then either stands still, or actually recedes a little before being ready to answer again with a new response to the force of life, that makes him grow. He has to recover a little before responding again. There are commercial, social, political, ethical and spiritual phenomena that seem to suggest for their alternate rise and fall a somewhat similar explanation ; and, as will appear, organisation under the command of the life-force frequently introduces longitudinal and transverse elements in order to carry out the alternate or intermittent action of life. That

a child grows in little leaps or bounds, and not continuously, is at least very interesting; and still more interesting seems to be the fact that, not only does it rest between its periods of growth, but that it actually sometimes recedes a little before responding to growth again, whatever may be the complete explanation of these facts. And that the motion of the universe, so far as our limited powers enable us dimly to understand it, and whether we look at its organic, or animate, or living parts, or at those which we term inorganic, inanimate or not living, seems to follow a similar law, is a consideration of very great interest. If it should turn out on further investigation, that there may be some reason to suppose that as our earth revolves around the sun, while our sun and all his planets may be engaged in the act of revolving round some centre at an immeasurable distance away; and if, at the same time, our sun and planets, all our solar system were rotating as one body on a common axis of its own, while perhaps other solar systems were similarly engaged, what units of time and space would suffice to sum up such a movement? But, perhaps, even then a diagrammatic representation of such a movement would, even if the whole were elliptical, have to be expressed by a series of spirals having an elliptical course, as these prodigious embodiments of natural forces wince under the power which procreates and maintains them, simultaneously wasting them indeed, but so slowly that, although it is inevitable that at some remote time they must come to an end, their duration yet seems to be for ever.

But how could man, with a life time of seventy years and a known racial duration of even seven thousand years, hope to gauge times and distances so far beyond his experience, and even beyond the utmost stretch of his imagination? And yet the growth of the bodies of little children, measured by ounces and by pounds, seems to conform to the same majestic law of a harmonious universe.

CHAPTER IV.

Behaviour and Qualities of the Food of Man-life.

CHAPTER IV.

EPITOME.

(Page 99). Behaviour and qualities of force of man-life. What does man-life do? That force a variety of pan-mono-dynamic, which gets from its Source omnipotence, eternity, infinity and other qualities. (Page 99). But man-life has other qualities like pan-dynamic. Life-force breaks up into two great divisions, plants and animals. All things organic and inorganic respond to the special forces which procreate them. Whole Kosmos alive and divisible into more living and less living, not into living and dead. (Page 100). Each form in the Kosmos the embodiment or incarnation of its own special force, hylo-dynamic, hydro-dynamic, hygro-dynamic, etc., etc., etc. But these divisions may or may not exist in Nature. (Page 100). All forces varieties of one energy. Man-life orderly; makes its own tools. Acts in direction of least resistance. Uses unconscious intuition. Introduces cells for sensitiveness. Structure of cells. The cell-theory. Plants and animals made of cells. (Page 101). This now accepted by science; but inadequate. As cells are joined by fibres, a cell and fibre theory more adequate. (Page 102). Why may not life-force, make fibres as well as cells? Cells introduced for response. (Page 102). Fibres also for response. How distinguish cell-response from fibre-response? Cells for sensibility. Fibres for conductivity. But are blood cells and lymph cells sensible? Cells are kytic, but joined cells are sensible; or rather life-force sensible through them, and also sensitive. Fibres conductive of life-force. Union of cells by fibres introduces associated sensibility. More complicated structure and more connections introduce sensibility of sensibility. (Page 103). Consciousness and self-consciousness. (Page 103). Knowing even as it is known through increasing complexity of structure and more and

more connections. Invitation to co-operate with the power that makes the Kosmos. May accept or refuse. Inanimate forces seem never to refuse. But is resistance a suggestion of self-will? Jupiter does not set up a world of his own. (Page 104). Nor our solar system. But higher powers exercise right to accept or refuse. Words very deficient. Need of new terminology: kytic: sensitive: sensible: conscious, etc. Terms should be used always in same meanings. (Page 104). Life-force never at a loss. As life-force can hardly be supposed to know, it probably acts under power that does know.

Introduction of specialised forms of connective tissue. (Page 105). Connective tissue contracts, *i.e.*, it shortens and widens. Muscular fibres a form of connective tissue. Two great kinds; plain and striated (page 105) under government of sympathetic and cerebro-spinal nerves. Arranged longitudinally and transversely to make tubes of body like arteries. Contraction of transverse elements narrows and lengthens arteries and somewhat empties them. (page 106), and tends to reduce function and cause pallor. This condition termed tone. Contraction of longitudinal elements will shorten and widen arteries and redden parts supplied, increasing function. This is termed stimulation. (Page 107). Simulation coincides with contraction of longitudinal elements. Tone with contraction of transverse. Poverty of language. Contraction of transverse followed (page 107) by contraction of longitudinal and vice versa. This causes halting or intermittent action. When exaggerated is rush and torpor. Body cannot bear continuous action. Life-force acts as if it knows this. (Page 108). But omnivadent or panhodic fibres introduced by life-force, as if striving for continuous action. Building up with lowering of vital action takes place mostly during sleep and under action of sympathetic nerves and is called anabolism. The life-force, as if fore-knowing, introduces the sympathetic nervous system for this purpose. Probably sympathetic and cerebro-spinal nerves introduced simultaneously. Katabolism (page 109) accompanies action of longitudinal elements under special government of cerebro-spinal nerves with marks of increased vital function as well as

wasting of parts which must be made good by food. Anabolism and slowing of vitality with katabolism and increase of vitality combine to make metabolism. Too long-continued effects of transverse contraction often ends in Anaemia: but anaemia caused by excess of action. (Page 110). And to get rid of it, it is often necessary to restrict the diet. (Page 111). Often simulates defect of action, but is from excess. Pallor caused in this way. As (page 111) it is often treated by increase of diet, this has furnished writers with cheap satire on doctors. These principles applied to constipation and its treatment. Is partial stoppage of action no doubt, but not due to atony, but the reverse. Should be treated by restriction. Too often treated by aperients, which really aggravate though they appear to relieve. Constipation cannot be cured by aperients. The reason why. Astonishing how people do not find this out. Dicta for treatment by diet. (Page 112). Constipation often followed by incurable conditions which might have been postponed or prevented.

Effects of over contraction of longitudinal elements: to increase colour and vitality generally. When studied in bowel, causes diarrhoea with wasting and sweating. Pulse quickened and temperature elevated in over contraction of longitudinal elements, while pulse is slowed and temperature lowered in over-contraction of transverse elements. Cannot cure chronic diarrhoea by astringents, or chronic constipation by purgatives. (Page 113). How astringents act in diarrhoea. Plausible reasons inducing us to use over-feeding in diarrhoea and in constipation, thus preventing our seeing that the true hope of cure is in restricting the diet. The diseases of over-contraction of transverse elements apt to culminate in cancer, those of over-contraction of longitudinal in tuberculosis. But (page 114) the best results I have seen in consumption have been got from restriction; as, however, no treatment cures many of the cases, one is afraid to recommend restriction, since the blame for a fatal termination is apt to be attributed to the adviser. Fewer opportunities arise of treating over-contraction of longitudinal. Still, cases occur—one referred to. Both patient and wife opposed restriction. Their reasoning

plausible though unsound. (Page 115). Case cured, and man living ten years after. (Page 115). Both wife and man convinced, though, as the man did not die, the sceptic may remain unconvinced.

Explanation of the rival views of Mr. Pilgrim and Mr. Pratt; but an explanation is possible. (Page 115). Paradox that effects of too much often simulate those of too little, paralleled in many cases in other departments of life, as in business, the burning of coals in a fire (page 116), etc.

Inhibition (pp. 116-7). Death often due to excess of action (page 117).

THE BEHAVIOUR AND QUALITIES OF THE FORCE OF MAN-LIFE.

Perhaps the best way to try to understand the action of the force of man-life or of life in general, is to ask what it does. I have, by implication, been doing this already to some extent in inquiring how a child grows, and also even in asking how the bodily heat is maintained. But it will be well to prosecute this method of inquiry a little further. Of course, the first point to be always kept in mind is that man-life (if it exists at all—and if it does not, how can it have qualities or do things?) is a variety of the one universal omnipotent, infinite and eternal energy, the pan-dynamic and the mono-dynamic by which, according to received philosophy, all things do consist. It is because it proceeds from an infinite source that pan-mono-dynamic is omnipotent, infinite and eternal, and has indeed many other qualities besides these, as has been already remarked. Because man-life is a variety of pan-mono-dynamic, many of its qualities are found to be qualities also of pan-mono-dynamic. But it has special qualities also, as will appear. The forms procreated by life in general soon break up into the two groups of plants and animals. Plants may be viewed as incarnations of phyto-dynamic (φύτον = plant), and animals as incarnations of zoo-dynamic (ζῷον = animal). They respond to energy in general, but plants specially to phyto-dynamic and animals specially to zoo-dynamic. All things living and dead respond to dynamic in general, but also specially to that form of energy of which they are the

immediate pro-creation. But as earth, clay, stones, metals, water, air, gases, etc., all respond to hylo-dynamic or the force of substance, the whole Kosmos or universe appears to be alive; and the proper division, therefore, that we ought to make of the Kosmos ought to be into more living and less living, into more animate and less animate, rather than into living and dead, or into animate and inanimate, as is so often done. Things, plants and animals are the incarnation, no doubt, of pan-mono-dynamic, but specially they are the incarnation of the particular forces that procreate them, things of hylo-dynamic, water and fluids of hydro-dynamic and hygro-dynamic, air and gases of aero-dynamic, crystals of crystallo-dynamic, chemic materials of chemico-dynamic, electric things of electro-dynamic, etc., etc., etc. Plants again are best viewed as incarnations of phyto-dynamic, and animals of zoo-dynamic. Man is the incarnation of anthropino-zoo-dynamic or man-life. Man-life is distinguished from horse-life or hippo-zoo-dynamic, from ape-life or pitheco-zoo-dynamic, from fowl-life or alectorido-zoo-dynamic, from elephant life, or elephanto-zoo-dynamic, and so on. Each of these forms is procreated by, while it is, therefore, the incarnation of the special variety of the energy that procreates it. Of course, these varieties of energy, hylo-dynamic, hydro-dynamic, electro-dynamic, and the rest, may have an existence in our minds only, and not necessarily in Nature, because we are not competent to consider the magnitude of the forces of Nature, nor the greatness of the Powers at work in maintaining the Kosmos without breaking them up into parts, in order that we may be able to comprehend them better; and we are not fit to say whether these divisions existing in our view, exist also in Nature. As, however, each of these varieties of energy is a manifestation of the one infinite pan-dynamic, it procreates its manifestations in the quite innumerable number of animals that we see (as well as those beyond our ken). Consequently, any one of these forms is sufficient to occupy the attention of man for a life time; and the knowledge of its qualities will not be exhausted then.

Like dynamic in general, man-life acts in an orderly way. What it does once it does again and again in similar ways.

Like pan-dynamic, it procreates the materials of its own expression: it makes its own tools.

Also it seems to act in the direction of least resistance, introducing, apparently intuitively, and without design or thought, the materials most fit to express consciously or unconsciously, or shall we not rather say, more consciously, or less consciously, the aims to which it is aspiring. Does it aspire knowingly or unknowingly to express sensitiveness, then it introduces cells for this purpose. Cells consist essentially of rounded organic forms contained in an envelope, more or less flimsy, enclosing fluid and semi-solid contents of rounded particles, called cell-contents, the particles being aggregated usually at a point in the cell to a greater extent than at other points. This is not usually in the centre of the cell, and is called the nucleus. And generally, or often, there is a smaller aggregation of rounded particles forming part of the Nucleus, and called the nucleolus or little nucleus. This nucleolus is believed to be, and probably is, the centre of active growth of the cell, or of the life-force that procreates it.

THE CELL THEORY OF PLANT AND ANIMAL LIFE.

Nearly one hundred years ago it was suggested that the organising power in plants and animals introduces the cell to accomplish its various works, or otherwise it was suggested, that plants and animals are made of cells. From what one can judge, this view has been accepted by scientific men, because, not many years ago, the president of the British Association for the Advancement of Science delivered an address, which assumed that the cell theory, as it is called, was more or less proved to be true. It seems difficult, however, or even impossible to rest satisfied with so imperfect a theory, either of the working of the life-force or of the force of man-life, because if cells are introduced as foci of life and as centres of response, they seem to require to be joined to one another, if associated response is to be manifested. For this purpose, connecting fibres seem to be required; and, according to the cell theory, these will be made out of cells. No doubt they proceed from cells, but why may not the force of life or the force of man-

life in its own domain be the cause of the formation of the connecting fibres, as well as of the cells themselves? It is, perhaps, somewhat easy to see how membranes can be made out of the walls of appressed cells, but it is not so easy to see how fibres can be so made; or if they are so, the life-force seems to be departing from its quality of choosing the path of least resistance, since it is easier to make fibres directly than to form them out of sections of membranes, themselves formed from the walls of appressed cells. There does not seem to be sufficient evidence that the life-force does not work in this way, or to make us think that if she can make cells directly she is powerless to make connecting fibres directly also. It seems, therefore, that instead of a cell-theory of organisation, it would be better and more complete if we suggest a cell-cum-fibre theory, and also if we add to it the suggestion or pre-suppose the suggestion that in working in its own domain it takes preferably the direction of least resistance. Words fail us almost wholly in inquiring into this domain in Nature, for if we say that cells are introduced by the life-force for purposes of response or even for sensitiveness, fibres seem also to be introduced for response and sensitiveness; and the question arises: how are we to distinguish cell-response and cell-sensitiveness from connective-tissue-response and connective-tissue sensitiveness? If we say, in order to meet this difficulty, cells are introduced for the manifestation of sensibility, and fibres are introduced for that of conductivity, we are at once compelled to inquire if it is a proper use of the term sensibility to say that blood cells or lymph cells manifest it? Cellity or Kyticity (from *cellula* or *κῦτος*) might perhaps be suggested to name the life phenomena manifested through cells; and conductivity (leading to unity and solidarity) to name those manifested through fibres or connective tissues. And this would enable us to speak of the kyticity (as if from *κυτικός*) of cells as such, connected or unconnected, while we should not use the term sensibility except as the name of the physiological facts manifested through cells when they are connected with one another by connective-tissue-fibres. Blood cells or lymph cells, moving about in a fluid medium, might be called kytic or perhaps? sensitive; while cells

joined to one another by connective tissue might be termed sensible, by which we mean that sensibility is manifested through them or by means of them. It is, of course, not the connected cells which are sensible, but the life-force which is sensible through them. Neither, indeed, is it correct to speak of organic but united cells as sensitive, since it is not they but the life-force which is sensitive through them. Fibres may be viewed as conductive of the life-force, and as introduced by the life-force for that purpose, and through union of cells by fibres we see how associated sensibility is manifested by the life-force. When cells become more complicated in structure and when, in addition, they are more intricately joined together in more and more varied directions, we see how the life-force may rise to the appreciation and exhibition not only of associated sensibility, but to that of sensibility of sensibility. The term conscious or consciousness may be applied to the physiological functions of cells when, intricately constructed, they are joined by fibres proceeding in more and more directions; that is, we may say, that the life-force manifests consciousness through sensibility of sensibility, and that it manifests self-consciousness, that it knows itself through such increasing intricacy of cell-structures, and through such increase in number of connective-tissue-unions as are very difficult to understand, and might be described as sensibility of sensibility of sensibility. If the cells become still more intricate in structure and the connections by poles or fibres still more numerous till they become omnivadent or panhodic ($\pi\acute{\alpha}\varsigma$ = all, and $\delta\omicron\varsigma$ = a way), that is, going in all directions, then perhaps the life-force may manifest not only consciousness and self-consciousness, but may provide the structural arrangements by which it reaches the height of knowing even as it is known, and of realising its unity with the Kosmos in which it has been placed, and realising that the invitation is offered to it to work along with the Power that makes and maintains it, and which, while it is, obviously quite capable of conducting the universe unaided, graciously calls upon the created or evolved soul or spirit to co-operate in the work. Of course, even then, the evolved powers have the right to agree to the invitation, or even to

set up their own will in opposition to that of the Source of the energy that makes the Kosmos and makes it a harmony. The forces which we call inanimate have this peculiarity, that they never seem to oppose the law that makes and maintains them—unless, indeed, into the terms action and reaction, attraction and repulsion, resistance and the like, we read a remote suggestion of commencing will and self-will? The planet Jupiter, with his seventy or eighty thousand miles of diameter and quite possibly behaving as a sun to his own moons, lighting, warming and fertilising them, never seems to shew any tendency to set up a system on his own account, but ever obeys, great as he is, the law that keeps him circling round the sun and holding his moons in obedient revolution round himself, while he keeps his appointed place in the solar system. Even our solar system itself keeps its appointed order in the same humble way.

But it is quite different with the higher forms and incarnations of energy. They exercise and are entitled to exercise the option of accepting or refusing the invitation given to them to co-operate with the forces that make the universe.

But the consideration of these and other points which, as they occur to the writer, no doubt do so also to the reader, shews in an increasing manner how very imperfect is our terminology, and the need for a great increase, if not indeed a re-creation of it. Whatever names we adopt, it is essential that we should always use our terms, kytic, sensible, sensitive, conductive, conscious, sensible of sensible, self-conscious and knowing even as we are known always in the same senses, and always with the connotation of the increasing complexity of structure and connections with which they are associated. If the life-force thus introduces cells and fibres for these purposes, working always in the direction of least resistance and working on similar lines in plants and animals, this is only another way of saying that the life-force makes its own tools. It seems never to be at a loss. If it does not know what it wants it acts as if it does know. No sooner is the need felt to express response than cells and fibres arise or are procreated to express or manifest it: and connected and complicated structures are introduced or procreated to manifest the more complicated emotions,

desires and will of life. As it seems difficult or impossible to imagine that the life-force knows what it wants, and as it always seems to be aspiring to more and more fulness of life-expression, the necessity of supposing that it is under the guidance and direction of a power that does know is more and more forced upon us. We may be compelled by the evidence to go further in this inference in this direction, but here the question may be left for the present.

THE INTRODUCTION OF SPECIALISED FORMS OF CONNECTIVE TISSUES, THEIR ARRANGEMENT, AND SOME OF THE CONSEQUENCES ARISING THEREFROM.

Not only is connective tissue introduced by the life-force for the purpose of conducting power from place to place in the body and making of it a harmony and a unity ; but we find this connective tissue assuming special forms.

Connective tissue has itself the property of contractility, that is it can be made to shorten (and at the same time to widen or thicken) when the purposes of life require it to do so ; but to respond better to contractility the simple contractile tissue may become more complicated in structure and take on many forms, and among these the form of muscular fibres. These are built up in peculiar ways and are of two great kinds, roughly distinguishable from one another according as they are plain or marked by transverse markings. They have been also termed involuntary and voluntary, but it is probably better to say that the plain fibres are mainly under the government of the sympathetic system of nerves, while the transversely marked muscular fibres are mainly under the government of the cerebro-spinal system of nerves. But both sets of fibres are able to manifest contractility better than the simple connective tissue fibre.

These fibres again specialised in these ways are often arranged by the life-force in peculiar ways, and a very common or usual way is by laying them down in longitudinal and transverse directions. The walls of the larger tubes in the body, the large blood vessels, the intestinal canal and

some of the secretory ducts are made in this way, the longitudinal and transverse elements of the walls of the tubes being introduced, like the warp and the weft of cloth, at right angles to one another. If we suppose the selvidges of a piece of cloth to be woven together so as to make a cylinder, this will give us a good idea of how the walls of organic tubes may be made in the body. In the smaller and smallest tubes the organic formative fibres need not be muscular and, in fact, often are not so, but merely membranous. It is, however, easier to understand the methods of their action if we consider the larger tubes, whose walls are made of muscular elements, for it is a little easier to conceive of muscular contractility, than it is to conceive of shrinking of a membranous formation or of a connective tissue fibre. Let us consider then the behaviour of a somewhat large artery, which is an organic tube conveying blood from the heart to the circumference of the body for the purpose of nourishing its various parts. The arterial coat being made theoretically of the two sets of muscular fibres, the longitudinal and the transverse, let us ask what happens if contraction of the transverse fibres of an artery occurs. Obviously the tube will be narrowed and lengthened, and as at the same time the blood will be driven out of the part of the tube where the transverse contraction is taking place, it will be somewhat emptied of blood, and the part supplied will become paler or less red than when the vessel is fuller of red blood. This action will obviously tend to reduce functional activity, because of reducing the blood-supply to the part. Contraction of the transverse (or circular) elements of the artery will therefore narrow the structure at the same time that it lengthens it, will deprive it somewhat of blood, and will reduce functional activity; and some amount of pallor will at the same time occur. This whole condition is usually termed tone or tonic action, although the term seems to have been applied rather by accident than by design, since the full bearings of the process and of the means of attaining it do not seem to have been quite appreciated. It arises by contraction of transverse elements.

But if now we ask what will happen if the longitudinal elements go into contraction, the answer is plain and easy

enough. Contraction of the longitudinal elements will evidently shorten at the same time that it will widen the artery, coincidently filling it with blood, and will thus tend to redden the part supplied by the artery, and will increase functional activity. This action is usually called stimulation, although, as in the case of the use of the term tone, when applied to transverse contraction, the full meaning of the use of the word does not seem always to be recognised. Stimulation, however, consists essentially of contraction of longitudinal elements, while tone is mostly applied to contraction of transverse, or, as they are often called, circular elements. As the transverse elements go round the tube of an artery, the reason why they are called circular is obvious. It is a little unfortunate, since it is apt to lead to confusion in understanding the work of man-life through the human body, that the term tone is usually applied to the state in which the transverse elements are contracted, while the term stimulation is usually applied to the state in which the longitudinal are contracted, because we also speak of stimulation both of the transverse and of the longitudinal. It is an instance of the poverty of language, which it is necessary to keep in mind in order to prevent confusion both in speech and thinking. As a physiological fact, contraction of transverse elements is followed by contraction of longitudinal, and contraction of longitudinal is followed by contraction of transverse, and it is through this constant succession or alternation of actions that the halting or intermittent, as opposed to continuous action of the human body (and other animal bodies, too) is obtained and maintained.

As shewing the imperfection of language, I suppose we should hardly be justified in saying that life consists of a series of tonic actions succeeding on a series of stimulant actions; but its processes do seem to be made up of a series of contractions of transverse elements succeeding on contraction of longitudinal, and of longitudinal on transverse; and so the alternation of effort and fatigue, or if it is exaggerated, of rush and torpor, so noticeable in the human body, is brought about. Certainly, however, organic structures made, as are those of the human body, are not fitted for prolonged or continuous action without periods of rest

being required before renewal of action can be effected.

We may view this in one of two ways: either we may simply state the fact and shew how the structural arrangements of the body account for it scientifically; or we may consider (as it seems to be better to do) that the force of man-life appears to have known, or to have acted as if it had known, that continuous action is impossible, and so to have arranged the structure of our bodies accordingly, because if it did not know or foreknow, it appears to have acted as if it did. An important point, necessary to take note of in this account of the action of the transverse alternately with that of the longitudinal, is to remember that when the one contracts, the other relaxes, that when there is contraction of transverse there is relaxation of longitudinal elements, and that when there is contraction of longitudinal elements there is relaxation of transverse.

There are, however, several other facts that come into notice, as we examine the effects of the alternation of the action of the longitudinal on the transverse and of the transverse on the longitudinal. First of all the life-force, though theoretically, and, perhaps, as a matter of fact originally building up the body in this way, soon proceeds to the introduction of omnivadent or panhodic fibres, that is of fibres going in all directions simultaneously. This it does apparently for the purpose, though without realising it (that is for the unconscious? purpose) of converting alternate into continuous movement. Notwithstanding the fact that, as no thing or no machine, however well made, is capable of bearing the action of force through it without wasting under the force, and therefore requiring repair and rest for purpose of repair—notwithstanding this and although knowing it in this unconscious or partially conscious way, still the life-force aims at the production of continuous movement by introducing omnivadent or pan-hodic fibres. But, confining our attention for the moment to the alternate action of the transverse on the longitudinal and of the longitudinal on the transverse, let us look at another point or two before passing on.

Contraction of transverse elements is associated, as we have seen, with diminution of function, with slowing of the

pulse-rate and of the respiration, with emptying of vessels and with diminution of the signs of life generally, and among other signs with tendency of the temperature of the body to fall a little. Further, this set of conditions is more under the government of the sympathetic system of nerves, and is at its height during periods of rest and sleep. Further than this, the repair of the body mostly takes place during this time, and in these conditions. This set of conditions is often termed anabolism, or the building up process of the body and the restoration of its waste. I do not wish unduly to complicate what has to be said, so I merely add this fact, that the life-force, again acting as if it knew and fore-knew what was going to occur, has introduced the sympathetic system of nerves as an outgrowth from the cerebro-spinal system of nerves to take charge when the life-force fore-knew that the cerebro-spinal system would be tired, and unable to carry on the work. Probably it would be as correct to say, that the life-force introduces the sympathetic system of nerves simultaneously with the development of the cerebro-spinal system, as to say (as the anatomists do say) that the sympathetic system is an outgrowth from the cerebro-spinal. The broad fact, however, seems to transpire that anabolism or repair, with its slowing of the life-processes, seems to take place under the government of the sympathetic nervous system during rest and sleep, when the cerebro-spinal nervous system is too tired to carry on the life-work.

The process of katabolism, or the katabolic processes on the other hand, are accompanied on the whole by contraction of the longitudinal elements of the body, which are mainly under the government of the cerebro-spinal system of nerves. These katabolic processes are marked mainly by signs of increased vitality, as by increase of the pulse-rate as well as by increased waste of the parts of the body, and by increase of the intellectual and emotional output of life as well as by increased waste of the parts of the body, which waste must again be made up by rest and food. The anabolic processes characterised by contraction of transverse elements, and by diminished and slowed signs of vitality following on the katabolic processes characterised

by contraction of the longitudinal elements, are called in their aggregate the processes of metabolism, and, of course, make up the processes of life, which is thus seen to be on the whole a halting intermittent series of progressions, a series of advances and recessions, rather than a continuous advance or a continuous recession, reminding us of the ebb and flow of the tides and of many facts in human, social, domestic, political and spiritual history, corroborating the general view taken in this essay, that the Kosmos is the manifestation of a single but manifold energy; of a pan-mono-dynamic emanating from a Source competent to account for it.

THE EFFECTS OF CONTRACTION OF TRANSVERSE OR OF LONGITUDINAL ELEMENTS CONTINUED FOR TOO LONG A TIME.

Let us now proceed to inquire what happens when, in place of the contraction of transverse elements being followed immediately or soon by contraction of longitudinal, the contraction of the transverse is too long continued. There will likewise be the inquiry what occurs when the longitudinal elements are contracted for too long a time. If the contraction of the transverse elements is continued for too long a time, the effects will vary, of course, according to the nature of the structure affected. A vessel will behave differently from the intestine. If the transverse elements of an artery are too long contracted the effect will obviously be to diminish blood-supply, and to cause such pallor as is often called anaemia.

It is to be observed in regard to this, as the anaemia or apparent anaemia is caused by excess of action, the best means to obviate it will be to take means to diminish the over-action, and not to stimulate the part in order to get rid of the pallor. For this reason it will be often proper to restrict the regimen in order to remove the over-contraction, although it is so plausible to consider anaemia as a mark of weakness, that restriction is very seldom resorted to, and on the other hand public opinion and medical opinion generally

recommend the opposite course of feeding up. Of course, it is because of the effects on treatment of whatever view we may take of the causes of over-contraction that I am considering them here. But for that, I should let alone a consideration of things that are often thought to be speculative and without influence on practical life and the practice of medicine. Anaemia is naturally thought to be an effect of weakness, but if it is caused by excessive contraction its treatment must be different from what it must be if it is viewed as the effect of weakness or deficiency of action. The pallor that accompanies neurasthenia is, as it happens, nearly always due to excess of action, and ought therefore to be treated by restriction, whereas it is in point of fact nearly always treated by the opposite plan; and this has afforded to writers and critics much of the cheap satire, which they are so ready to vent on the practitioners of the medical art. These points, however, come into greater prominence, when we come to consider the over-contraction of the transverse elements in producing constipation of the bowels. Obviously if this action is long continued, after a preliminary emptying of the bowel, which is soon forgotten, a state will set in in which the bowel does not act at all, or acts only seldom and at long intervals. There is certainly a stoppage of action, or an interference with action, which soon forces itself on our attention. Cessation of action or stoppage of action, partial or complete, is, of course, inaction; and many people and even many doctors, who ought to know better, term it atony. Stoppage or partial stoppage it certainly is, but atony? Is it atony? No, it is diminution of action through excess of action, and obviously the proper method of combating it is to diminish the causes that lead to it. If we call it atony we are insidiously led to increase them, that is we are induced to order more food, and certainly far too seldom to recommend the ingestion of less. Of course the usual course adopted is to recommend the use of aperients, whose remote effects however are usually, after being immediately followed by over-action, to aggravate the constipation. Failure to understand this is the reason for such a wide spread use of aperients, that it is said that seventy tons of aperient pills are used in England

annually without curing the English constipation. Plainly, long continued constipation cannot be cured by purgatives, because these act by causing over-action of the longitudinal elements of the bowel, and this action of the longitudinal elements is in time followed by a proportionate over-action of the transverse, which was the original concomitant or precursor of the constipation. The condition is therefore aggravated. One might have thought that this is so plain that every one might have known it. And yet, notwithstanding this, we hear of persons taking aperients for years and years. I knew a person who took an aperient every day for thirty five years, without curing the constipation for which the aperients were taken; for of course it was necessary as one sort lost its effects, to have recourse to another and then another and so on. Strangely enough the people who behave in this way are often shrewd and worldly wise, and capable of performing efficiently most of the duties of life. The proper method to cure constipation is to reduce the food input, because obviously the over-action of the transverse elements is due to over nutrition through over ingestion of food; so that if persons find themselves constipated on four daily meals they ought to take three for three months. If at the end of that time they are not relieved they should take two daily meals for say six months, taking a free allowance of green vegetables. If at the end of that time they are not cured, they ought to go on to one daily meal. It is most important to cure this condition, because it is apt to be followed by some incurable affection, which could have been postponed for many years or even obviated by proper treatment.

EFFECTS OF OVER CONTRACTION OF THE LONGITUDINAL ELEMENTS OF THE BOWELS.

If over contraction of the longitudinal elements of vessels is long continued, the effect is to cause a heightening of colour, which is often mistaken for the ruddy glow of health, but being due to over-stimulation and over-nutrition is not

really a mark of health (but its opposite. But the condition is better studied when it occurs in the bowel, for then it is characterised by chronic or long continued diarrhœa, accompanied by wasting and very often by sweating, which again is accompanied by over-stimulation of the longitudinal elements of the sweat ducts.

Conditions in which over-contraction of the longitudinal elements prevails are generally accompanied by fever, with elevation of the temperature and quickening of the pulse, while conditions characterised by over-contraction of the transverse elements are frequently characterised by the opposite state of sub-normal temperature and slowing of the pulse. Both are, of course, abnormal, but they agree in this, opposite as the conditions seem to be, that we can no more cure chronic diarrhœa by astringents than we can cure chronic constipation by purgatives. The use of astringents is (often without our perceiving it) intended to cure the diarrhœa by causing contraction of the transverse elements of the bowel, whereas the true method of combating it ought to be by reducing the over-stimulation of the longitudinal elements; and this is best effected by diminution of the input of food. This, however, is very seldom resorted to, because the plausible reasoning arises to our minds that as the accompanying diseases are characterised by wasting, and as the waste of the body must be made up out of food, it cannot be right to reduce the food. An exactly similar fallacy misleads us in the opposite condition of over-contraction of the transverse elements: viz.: that as the temperature is sub-normal and all the wheels of being slow, the pulse-rate among the rest, it cannot be right to restrict the diet, and so it is borne in on us (partly by our foolish analogies between the body and the steam-engine, already dealt with) that the proper indication is rather to increase than to restrict the diet. But in both cases the plausible reasoning is wrong, and as both over-contraction of the transverse and of the longitudinal elements of the body are due to over-nutrition, the proper method of treatment is to restrict the input. But even the few people who may be convinced that it may be possible to elevate the temperature and pulse rate and vitality generally by reducing the block

which is causing them, fail altogether to see the similar possibility when dealing with the wasting that characterises those diseases, in which the longitudinal elements are over-stimulated. No doubt, the former conditions are apt to culminate in cancer, the latter in tuberculosis; and the latter is now universally treated by over-feeding.

I am very sorry to say it, but the only benefit I have ever seen in phthisis or consumption of the lungs has been got by restricting the diet. Unfortunately, most of the cases are incurable, and therefore anyone who recommends restriction of the diet is apt to be blamed for the untoward result, which usually happens. And so it happens that we are disinclined to recommend what, as it is not certain to cure the patient, is usually considered by the friends as the cause of the untoward issue. Most of the cases of tuberculosis of the lungs treated in sanatoriums seem to me to die soon. Much gladness is expressed that in the sanatorium some gain of weight is often experienced. This, however, is generally lost, and soon, after the consumptive leaves the sanatorium. As the lungs appear to be introduced by the force of man-life to carry off some of the waste products of digestion it seems to me to be, theoretically, unsound to treat pulmonary consumption by feeding up; and practically the treatment seems to be most unsatisfactory. The diarrhoea that generally accompanies pulmonary consumption, if associated as it often is by the co-existence of the tubercle-bacillus, is plainly due to over-stimulation of the longitudinal elements of the bowel, as is long-continued diarrhoea in other conditions. If so, how can it be proper to aggravate this already overloaded state by increasing its causes?

We have not quite so many opportunities in medical practice of treating over-contraction of longitudinal elements as we have of treating the chronic constipation, that is the effect of the over-contraction of the transverse. Still we have opportunities from time to time, and I can think of several, and among the rest of a man about thirty-eight years of age, wasted and attenuated and suffering from chronic diarrhoea. When the explanation of his case was put before him, it was extremely difficult to get him to agree to the force of the reasoning, and still more so to obtain his

assent to the restriction of the diet which I recommended. His wife was, perhaps, more opposed to the treatment than he was himself; and, although I have long known that Englishwomen are never happy unless their men-kind are eating themselves to death, I knew, of course, that she did not believe this, and also I could not doubt her sincere regard and affection for him. Neither could I fail to see the plausibility of the reasoning which insisted on the view that a thin, wasted and attenuated man evidently going down hill must be fed if disaster was to be averted. I am perfectly certain that he would have died, if he had attempted to go on as he was doing. No doubt, I cannot prove that I was right, because happily he has not died; but, after more than ten years from that time, is still alive and well, turning out every morning early to work without any food and waiting till dinner time before having any. Both his wife and himself are entirely convinced that the advice he got and followed was sound, as also that he would have lost his life if he had not followed it. It is, no doubt, quite easy to hold up to ridicule the rival methods of Mr. Pilgrim and Mr. Pratt, the opposite treatment of the feeding and the starving doctor, but although it is not quite simple to explain it an explanation is possible and can be given with a little trouble.

If it is said that in a large number of cases patients will get well whether we recommend them to starve or feed, that is true enough; but in a very large number of cases the recovery and the life of the patient depends on the advice they get, and on the persistence with which they carry it out. The paradox that the effects of too much food often appear to be the same as those of too little is after all paralleled in many conditions of life. In business, affairs become slack or come to a stand still either when there is a glut of goods on the market and traders are consequently afraid either to buy or sell; and business also comes to a stand still, if there are no goods or too few goods. A fire also may be burning low and poorly because there are not sufficient coals on it, or it may be burning badly because it is choked or blocked. In the former case, we put more fuel on the fire; while, in the latter, we put the poker in and by

gently raising the coal allow the air to enter, so that what is in the stove may be consumed and heat evolved.

INHIBITION.

Many of the facts mentioned in this chapter are treated of under the general term inhibition in physiological writings. I have avoided the word because a good deal of confusion seems to attach to it. Sometimes it is used simply as synonymous with stopping or diminishing physiological action, as when we say that to inhibit function is to stop or check function, even if it is not stopped entirely. But if the reader will in his mind define inhibition as the stoppage or diminution of function by excess of action of structure, he will have as good an idea of the meaning of the term inhibition as he can have. And by thinking for a little, he will see not only how over-contraction of the transverse elements of the structure of the bowel inhibits function and causes constipation, but also how inhibition through over-contraction of the transverse elements of the heart may and does often lead to death through stoppage of the functional action of the heart in what is called angina pectoris. And on the other hand, he may perhaps understand how over-contraction of the longitudinal elements of the body may lead remotely to inhibition or interference of another and at first sight opposite kind in which functional activity is greatly increased, and (depending on the structures affected) may lead to excessive diarrhoea with sweating and wasting and fever, or to great quickening with weakening and "running" of the pulse, such as is found in many cases of collapse. These conditions might be termed (though they never are so termed) cases of inhibition of function caused by over-contraction of the longitudinal elements of structure, for although for a time they are accompanied by increase of functional activity, that does not last long; but soon, equally with the over-contraction of the transverse elements, brings life to an end. The practical point to be kept in mind is that both end fatally or may end fatally through the over-action of structure that brings functional

activity to an end. It is somewhat upsetting to our ideas to be compelled to think of death or the going out of life, as due to excess of structural action and not to that deficiency of it which we associate with death. But, if, as seems to be the case, death very often results not from inaction, but from excess of structural action, how very important must this consideration be in the minds of those advisers who wish to advise the people how to live long, happy, healthy and efficient lives.

CHAPTER V.

The Classification of Diseases.

CHAPTER V.

EPITOME.

(Page 121). Classifications of Diseases.

(Page 121). Diseases are departures from health. Diseases acute and mild, short and long. Definition of acute, peracute and subacute and mild. These shade off into one another. No hard and fast line.

(Page 122). Chronic diseases long-lasting. Acute and chronic an illogical division. Asclepiades introduced the confusion. Severity has no logical connection with length of disease. Why (page 122), the retrograde classification persists. Definition of short diseases. Recurrent diseases—some persisting causes for. Generally in food-habits.

(Page 123). Diseases beginning as recurrent end as chronic. Even chronic diseases somewhat intermittent. Chronic not synonymous with incurable. Elevation or heightening of some signs of life characterises acute diseases; but other signs of life diminished. On the whole we tend to overlook the latter; and to associate diminished signs of vitality rather with chronic diseases which we call being "run down" and attribute to under-feeding, and so recommend should be treated by over-feeding. Hence the satire vented on doctors, since some doctors think them due to over-feeding and treat them by restriction of diet. (Page 125). Mistake of Parkes might have been prevented. Futile to expect to abolish infectious diseases and consumption by free ventilation. Wrong alimentation the cause of many diseases. What the medical profession ought to exist for. (Page 126). Tuberculosis wrongly alleged to be a housing disease. People cannot live insanitarily in sanitary houses without being ill. Habits, not houses, the cause of disease. (Page 126). Simple and specific diseases.

Diseases *and* germs may be effects of mismanagement of body, especially of wrong feeding. (Page 126). Diseases associated with micro-organisms must also be treated by proper feeding. Rather unpromising to try to treat effects of germs by cultures from the same or similar germs. (Page 127). Did vaccination cause the cessation of smallpox? Opinions differ. Epidemic diseases die down (page 127) and replaced by others. Classification from presence and absence of micro-organisms not sound because all life-processes may perhaps be associated with action of micro-organisms. As healthy people often carry disease germs about, probably their importance is exaggerated. Is legislation wise in allowing (page 128) officials to force their opinions on public by fine? Probably all bodily processes are accompanied by growth of germs. Incompatible with freedom to allow one set of opinions to dominate others.

CLASSIFICATION OF DISEASES.

If we proceed to enquire what are the kinds of diseases that humanity brings on itself, we do not find the classification very clear or logical. To begin with, diseases are, of course, departures from health or disturbances of health, and these disturbances have been divided into acute and mild, or severe and slight: and also into short and long. But sub-divisions into peracute and subacute have also been introduced, and definitions of these conditions are not often forthcoming. Acute diseases may be described as those in which the pulse-rate is from 120 to 130 a minute, and in which the temperature of the body is, say, not above 103° or 103.5°F . If the pulse rises above 130 or the temperature above say 103.5°F . or 104°F ., the condition is peracute. Mild conditions or diseases are those in which the pulse-rate is not over 100, and in which the temperature is from 100°F . to 102.5°F . A division is often made of diseases into subacute. In these the temperature is from 100°F . to 102.5°F . say; and the pulse-rate varies from 100 to 120 a minute.

These conditions obviously shade off into one another by

insensible gradations, and there is no hard and fast line between acute, subacute and mild diseases.

Chronic diseases are those which are long-continued, and may be defined as those which last for say three months or longer. The usual division of diseases into acute and chronic is, of course, quite illogical, for acute is the opposite of mild, while chronic or long-continued is the opposite of short. It was Asclepiades of Prusa who was a rhetorician and was the doctor of Cicero (in the last century before the Christian era), who made the retrograde step of dividing diseases into acute and chronic, so interfering with the much better division of Hippocrates (5th century B.C.) into acute and mild diseases, and into short and long. Obviously the severity or acuteness of diseases has no logical relation to the length of their duration, although, no doubt, it often has a very practical relation to it, because if diseases are very severe, either they must be recovered from in a comparatively short time, or the patient must die; and this is, no doubt, the reason why the rhetorician's division of diseases attracted the rhetorical mind of Cicero, and why the retrograde division has persisted to this day. Chronic, however, is the opposite not of acute, but of short; and short diseases may be defined as those which last for a period shorter than three months (say) and, in fact, they usually last for a much shorter period than this, since they are generally over in a few days or a week or two.

Now both the long and the short diseases, and the peracute, acute, subacute, and mild may consist of single attacks, or they may be recurrent, that is they may occur once and be recovered from, and may then recur and again be recovered from, like sick-headaches or bilious attacks or colds or attacks of asthma; and of course they may recur many times. Evidently when diseases recur many times, there must be something in the patient's condition which makes them do so. If this condition (which is nearly always some error or errors of diet) is not treated or removed or altered, the disease will recur. And if the cause continues unaltered the disease tends to recur at shorter and shorter intervals, and usually with increasing severity, until in course of time (if the patient does not meantime die of an acute inter-

current attack) the intervals disappear, and the patient is always ill, or suffers from chronic illness. Diseases therefore which begin as recurrent end as chronic or long-standing (much longer often than three months) or they may become constant. Even when a disease is constant however, the patient is not always equally ill, for he has intervals of betterment alternating with periods of time when he is worse, for the recurring nature of the attacks is maintained, even when the intervals are so short that the change from better to worse or from worse to better is hardly noticeable.

Obviously, however, it is very difficult to cure or get rid of a disease, which has come on in this insidious way; and this experience has led to the rather common notion in the public mind, that chronic is synonymous with incurable. Difficult to cure no doubt chronic diseases are; but the meaning of chronic is long continued, and has no logical connection with curability or incurability.

The characteristics of the acute diseases are elevation or heightening of some of the most important manifestations of life, with diminution of others. Thus the temperature is usually increased, the pulse and respiration quickened, and the skin flushed. But on the other hand other characteristics of the acute diseases are shewn in diminution of the signs of life. Thus the skin is dry, the tongue furred, the mouth dry, the bowels inactive, and the urine high coloured, over-concentrated and scanty. The increase of the pulse, temperature and respiration are so noticeable, that on the whole we associate the acute diseases with the signs of increased vitality, though we instinctively feel that these can be temporary only, since if not soon relieved or diminished the patient will die. But on the whole we are apt to overlook the signs of diminished vitality, and to associate the acute diseases in our minds with the characteristics of increased vitality.

The chronic diseases, on the other hand, we tend to associate with marks of diminished vitality, for we often find in them slowing of the pulse, diminution of the temperature, slowing of the respiration and pallor of the face. No doubt these conditions often alternate with their opposites, when an intercurrent attack of some illness occurs, when we

describe the condition as subacute or even acute, and when we recognise that the recurring illnesses are in course of settling down into chronic illness. But the reader will probably not have failed to recognise that while the acute diseases can generally be attributed to excess of some kind, and are, in fact, generally so attributed; the chronic and recurrent diseases are equally attributable to same sort of excess also, which has usually been operating, or acting for a much longer period of time than that which brings on the acute diseases; but still excess it is all the same.

Here, however, public opinion, and not infrequently even medical opinion takes the opposite view, attributing the marks of low vitality, the pallor and want of energy, to being "run down," as it is called, which, again, is attributed to under-feeding and is recommended to be treated by increasing the food; and it is at this point, and because of the different views which can be taken as to the causes of the conditions, and which are in fact taken, that the opposite advice of the starving and of the feeding doctors obtrudes itself on public attention and gives rise to the satire heaped upon the medical profession.

As to treatment, obviously it is more important to consider the causes of the disease, when we have to manage chronic or recurring conditions, than when we have to manage acute and short diseases, since the latter mostly pass off of themselves, while the recurrent come again and again, unless something is done to obviate the causes which induce them. The most far-reaching law then in practical medicine comes to be this. If you want to treat a disease which occurs at longish intervals of time, you should look for a cause, which is either constant or one which is acting at shortish intervals of time. If you do not do this, and if you do not take steps to obviate the action of the cause, you may succeed in palliating the patient's sufferings perhaps, but you cannot cure them. Now, as nine times out of ten, or even nineteen times out of twenty, the cause is in the patient's food habits (since the food makes the blood, and the blood nourishes or over-nourishes the body), the practical translation of this principle takes the following form: Does the patient take four meals a day? If so, advise him

to take three for say three months. If that does not result in the cessation of his recurring attacks of sick-headache, bilious attacks, asthma, influenza, recurring sore throats, colds, bronchitis, pneumonia, or of chronic conditions like chronic constipation, which are generally recurrent before they become chronic; then advise him (or her) to eat twice a day only for six months. If this does not put a stop to his recurring or chronic illness, then advise him to eat once a day only for six months. If this plan does not cure him (though it almost always will, if the patient is curable at all) let him have a fast for a longer or a shorter period, until it is safe for him to return to one, or perhaps two, daily meals. The reasons for the adoption of this line of treatment are, that the blood is made by the life-power from the food, that the recurring (or chronic) illness proves that the blood is improperly made; that the improper condition of the blood is probably due to the presence of waste products in it, which waste products are deposited from the blood into the tissues, so occasioning the recurring or chronic illness; and that the most likely way of combating these conditions is by reducing the amount of stuff which is going into the blood. Of course, as an implicate of this process of reasoning, it is assumed by the adviser that neither the strength nor the heat of the body depends on the food, and that the sole function of food in the grown body is to restore the waste caused by the action of the force of life through it. The use of this reasoning, followed by the practical changes consequent on it, would have rendered the great discovery of the circulation of the blood of far more practical consequence than it has been; although I venture to think that the circulation of the lymph is capable of being made the means of introducing consequences as useful, if not even more useful than those, which might have flowed from Harvey's discovery. A proper use of these two discoveries would probably have prevented the hygienist Parkes from saying, in the nineteenth century, that of all the causes of disease, breathing bad or vitiated air is the chief, and would also have freed us from the futile expectation that we could abolish the infectious diseases and consumption by free ventilation or by providing better houses.

If the suggestion again arises in the mind of the inquirer, that the medical adviser has had an instinctive fear of expressing his opinion that wrong alimentation and not breathing bad and vitiated air is the chief cause of disease, in case his patients should leave him and seek advice elsewhere,—well, the question still arises—what is the medical profession for? Does it exist in order to advise the people how to live? Or is its proper object to aggrandise itself? I have actually heard a sanitary reformer say on a public platform that tuberculosis is a disease of bad housing, or a housing disease, as he called it. He was carried away so by the dictum regarding breathing bad air, that he actually allowed himself to think, that we might live insanitarily in sanitary houses without being ill. But, obviously, he must have thought very hazily about the matter, when he allowed himself to make a statement like that, so contrary to all experience, that it is the habits of the people inhabiting houses far more than the kind of houses they live in, that is the chief cause of the illnesses from which we suffer.

A further division of diseases has been made in our generation into simple and specific, or into those diseases not known to be associated with the growth of micro-organisms in the blood and tissues of the body, and into those either known or believed to be associated with the growth or presence of such micro-organisms, or germs, as they are often called.

I say "associated with" the growth of such germs and not "caused" by them, because I have already referred now more than once to the three different views that can be taken of the constant association (but it is not quite constant, for the presence of the germs cannot always be demonstrated) of two things with one another. Obviously, if we take the view which commends itself to me, that the presence of the disease and of the micro-organisms are effects of mal-nutrition, that is of wrong feeding, and, generally speaking, of over-feeding, (occasionally, no doubt, sometimes of under-feeding) the same considerations as to treatment must determine our management of diseases associated with micro-organisms, as have already been referred to under the heading of acute and mild and short and

long and of recurring diseases. They are best treated, as obviously also, they can be best prevented by proper management of the food, which makes the blood which nourishes the body. And thus we are driven to conclude, that all the methods suggested of combating one set of germs by vaccines, and sera obtained by cultivation of the same, or of other germs, become a rather barren and unpromising, and even more or less an unphysiological means, because, even if successful, they at the best aim at removing the effects of one poison from the blood by inserting another; and fail to give any answer to the question why germs are there at all. There may, of course, be cases where such methods are the best that one can suggest, but although best, they are very unsatisfactory. If, as a reason for resorting to this kind of treatment, it be alleged that smallpox has been destroyed by vaccination, it must be admitted that smallpox has almost disappeared from the country; but there is a great difference of opinion among medical authorities whether vaccination is the cause of this. Typhus fever has practically disappeared from this country; so has plague; and no vaccination has been resorted to in order to abolish either of them. Scarlatina is much less rife than it was, but its reduction has not been effected by vaccination or serum injections. The truth is that epidemics die down, and their place is taken by other forms of infectious and contagious diseases; typhus fever and smallpox, black death and plague dying down, and being succeeded by influenza; and whosoever wants to understand disease and illness with the practical view of preventing their recurrence in the future must keep facts of this sort in his mind. Although, for the most part, epidemic diseases, like influenza and diphtheria, are believed to be associated with the growth of germs or micro-organisms in the blood and tissues, while simple diseases, like bronchitis or gastritis, are not known to be so associated, the distinction has become one of very doubtful value. It is doubtful whether all life-processes are not accompanied by the growth of micro-organisms. In the case of many of these their presence is quite compatible with health, and so the germs are considered to be benign. But in the case of others usually

associated with disease, it has been shown that persons in apparent health may be carrying them about. It is alleged, for example, that in the mouths of many persons apparently well the diphtheritic micro-organisms can be found. This makes us suspect that too much importance has been attached to the presence of micro-organisms in disease, and leads us to doubt the wisdom of the legislature in allowing officials holding one set of views to fine other citizens, because they hold different views. As it is very likely that before long all the processes of life in the body will be shewn to be associated with the development of micro-organisms of some sort, it becomes very important that we should not exaggerate their significance, even when they are present. It seems to me that, though the presence or absence of micro-organisms is a good enough basis on which to classify diseases, it is making an unjust use of the fact of their presence to use it as the means of penalising individuals and interfering with family life. And I venture to think that no free people ought to allow its legislature or its government to treat it in so unjust and so high-handed a manner or to inflict fines, and disabilities on citizens in the domain of unproved opinion.

CHAPTER VI.

Summary and Conclusions.

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EPITOME.

(Page 134). All persons seem to have very imperfect view of dignity of body. We do not understand nutrition. Body not a machine for getting up heat like steam-engine. Untrue that body is efficient in proportion to food supplied. Surprising that more knowledge is not abroad after 7,000 years residence on the earth. (Page 134). Necessary to change if we are to live longer and better. Circulation of blood discovered nearly 300 years ago, but made little change in practice because not linked up in opinion with formation of blood from food. Perhaps because we feared to entertain idea of self-restraint? Changes in medical practice not made by our knowledge so much as by increased sensitiveness of opinion. (Page 135). Objection to harshness and perhaps want of virility? Changes compatible with increased knowledge, but not caused by it. (Page 135). Some always recommended small input of food and still lived long and healthily and efficiently. Even scientific men have said the same thing, the public laughing at the different views of doctors. But not really a laughing matter. More weight of authority now than before. (Page 136). We do not know what the duration of life should be. Evidence from Registrar General and Insurance Companies' records. (Page 136). But we have not inquired why their records are as they are, or if they ought to continue the same. We do not know when the body should die. If

only enough food ingested to restore waste, what should stop the process of living? Why not attain ages of Adam or Methuselah? No reason visible why not. Body dies because blocked and choked, and we blame its faulty construction and not ourselves. (Page 136). The force of man-life a variety of pan-mono-dynamic. Why may not some forms of energy be self-regulating? Life not determined by moleculo-chemical forces: for if these may determine life, life may determine them; and life and moleculo-chemical forces may be effects of pan-mono-dynamic. Evidences of life-force in earth, air, water and also in the heavens. (Page 137). Further information about man-life. Orderly. We can even predict how it will act. Introduces cells for kyticity and fibres for unity, and more complicated structures more intimately joined for higher and higher mental and spiritual manifestations. Consciousness, sensibility, knowing as we are known. Knowledge of unity with Kosmos and of human consciousness with general consciousness. Body a harmony within a harmony. (Page 138). The Kosmos a harmony not a chaos. Some confusion apparent, but, as bodily disturbances often lead to better health, so perhaps material disturbances may lead to better order. (Page 139). The critic who mocked when the moon was wrenched from the earth would have been premature because not seeing how seasons were provided for, long before men appeared to enjoy them. Is it good tone to say why am I made thus? (Page 139). Life-force just. Law cannot be broken with impunity. And merciful, for though we deserve death we still survive both individually and as a race.

(Page 139). Further conclusions. The widest-spread law of nature attraction which leads to bodies rotating and revolving in orderly orbits; with occasional disharmonies. Man-life improvable only through self-restraint. But self-restraint not to be pushed to asceticism. Still each of us must be ready to die for the whole.

(Page 140). Man-life acts as if knowing and fore-knowing. Makes anticipatory provision. Developes lungs from digestive tract and inserts lymph-spaces and lymph-ducts in connective tissues, the dumping ground of blood. Seems

to say Time shall be no longer! and nothing shall be lost. Function of appendix to prevent constipation. Also man-life seems to suggest order in rank or importance as well as in time, suggesting subordination of respiration to digestion and of sympathetic nerves to cerebro-spinal-nerves; also its independence of time. (Page 141). Reproduction points in same direction, making provision for the perpetual reconstruction of the evanescent. The lavishness of man-life. When parts of body are lost, other parts take on their function. Dexterity of one-armed and one-legged, and increased sensibility of blind and deaf. When parts of brain lost, other parts often take on their function. Provisions for continuance in large number of seeds and litters of animals. (Page 142). If men attained full duration of life, families would probably be smaller. No stint in Nature, but provision ample for all her sons. We, not Nature, destroy the provision. Our danger from over-indulgence in good things of life, so choking and blocking our bodies. Some have far too much; some far too little. But unequal distribution cannot be remedied by force, but only by persuasion. Force does more harm than good. Human beings should imitate inanimate nature like attraction and the parting with heat and light to colder and darker. Should voluntarily part with their surplus. Without this, no real improvement is possible. How this is to be done is a supremely important question, but not the subject of this essay. Not beyond possibility that this may happen. When it does, medicine will find herself unnecessary and will certainly give up her compulsory methods as ecclesiasticism has done and law may also do. (Page 143). If evolution slow, nature also uses mutation. Arising of a Melchisedeck from time to time, and of organisations for whom their ancestors do not quite account. The mutation in humanity, by which every man shall think not only of his own things but also of the things of others, not impossible. Such mutations have always appeared among men. Indeed, they seem to be more numerous, not less numerous, than before. Such a mutation as shall affect all, and even suddenly, not impossible.

SUMMARY AND CONCLUSION.

It seems to have resulted from the examination of medical opinion and of political opinion, as well as moral opinion, or the opinion of the man in the street or at the desk, that very imperfect views are held by all these sets of people of the dignity of the body, which each individual of us inhabits for the period of our natural life. It sounds incredible, but our examination seems to suggest that it is true that we do not understand nutrition, and that our generally received analogies between the body and the steam-engine have unconsciously misled us by suggesting, though without exactly saying so, that the body like the steam-engine is a machine for getting up heat, and that as the more coal there is in the engine stove the greater is the amount of heat and the more efficient the engine, so in the body the more food is consumed the greater is the efficiency of the bodily machine. If, after dwelling on this planet for some 7,000 years at least, man knows so little of the body he inhabits, as that even experts talk of the body in the opposite ways that they do, the hope that we shall ever understand, and understanding shall be willing to make the changes in conduct that shall give the body a chance to reach efficiency and a reasonable measure of longevity and of freedom from illness becomes very remote. Even if we say that the onset of the dark ages impeded progress, still we must remember that it is now nearly three hundred years since the discovery of the circulation of the blood, and that the modern era of which we boast ourselves so much has been running for quite that length of time. If, instead of blustering about our own great acuteness in discovering the circulation of the blood, we had asked ourselves the simple question, since the blood is made from the food, how much food ought we to put into the body, and how often ought we to supply it, in order that we might have good healthy blood, should we not have probably advanced to a much better understanding of the body and of its diseases than we have now? Why have we not done so? Is it because we felt or feared that such an enquiry might suggest to us, that we ought to set up

a mode of life, that might demand some amount of self-restraint as a first step in conduct? And that, as we were determined not to listen to such suggestions, we refused to make the inquiry? This is a possible suggestion, and though I do not say that it is the main or true reason why we have not converted our knowledge of the process by which food is assimilated into blood and body stuff into a more practical body of doctrine and practice than we have done, still it seems to have had a great part consciously or unconsciously in the course we have taken, as well as in that which we have not taken. Let us not deceive ourselves. The discovery of the circulation of the blood has made little or no change in our practice. The bleeding, the purging, and the blistering went on much the same after Harvey's discovery as before it. It is rather a change in public opinion, and the distaste for harsh and strong and painful methods of treatment, perhaps also a certain amount of loss of virility in the race, that has altered our practice than the increased knowledge which we have acquired. True, the amelioration of our methods has been shewn to be compatible with our increased knowledge. Still it would not be true to say, that the increase of knowledge has been the cause of the amelioration of our methods. Long before Harvey's time, men like Cornaro have from time to time recommended a diminished input of food into the body, and have shewn that doing so is compatible with long, happy, healthy and efficient life. They have felt the truth rather than been able to demonstrate the scientific reason for it. And since the time of Harvey's discovery in the seventeenth century, many scientific authorities have given the same advice with more or less fullness of demonstration, while the public looking on have good-naturedly laughed at the opposite practices of the starving and the feeding doctors. It is, however, no laughing matter for humanity to determine which of these opposing sets of opinion is nearer to the truth, for indeed the duration and the effectiveness of life, as also its painfulness and suffering as well as its pleasantness, depend on its settlement. If it has been hitherto felt that the good results of a low input of food were demonstrated practically rather than scientifically, and even that

the scientific recommenders of such methods were few and perhaps wanting in weight of authority, what are we to say now? Have we not now a sufficient induction of considerations both from the practical and from the scientific and philosophical sides, which enable us to build up a body of practical rules, that when applied to conduct shall enable us to use the body more healthily, more efficiently, and for a much longer duration of time, than we have hitherto done? If so, the duration of life, besides being longer, would also be more happy. As to the length of its duration, we seem to know very little. True, we have records extending over about eighty years, made by the Registrar General, and in the books of our Insurance Companies for a longer time than that, from which we can say that the majority of a generation died at certain ages, and that only a very small proportion attain to centenarianism. But we have not enquired why this is so: nor have we asked if it be still true, as it has been for the past two or three thousand years, that three score years and ten form a common average for the duration of human life, why it is so or whether, if we altered our views and our ways, it might not be different. I do not know when the body ought to die. I know when it does die. The methodic records kept give us the information.

But the question remains—it probably has occurred to the readers of this essay—if the sole function of food in the grown body is, as seems to have been demonstrated, to restore the waste of the body, for how long ought that process to go on, provided that no more food is ingested into the body than is sufficient to restore its waste? Why should the process ever stop? If the body is a self-renewing machine, through the action of the wonderful powers of man-life, what is to hinder the process of renewal from going on indefinitely, or what is there to hinder the body from attaining the ages alleged to have been reached by the patriarchs, by Adam or Methuselah? I must say I can see no reason to hinder this. I know, of course, or I think that I know, what does hinder it. We choke the poor body up with too much stuff: we clog and block it, and when it dies long before its time, or when its structures break in place of stretching, we seem more ready to blame the bad construc-

tion of the machine than its human engineers for their failure to understand its working. I, at least, cannot give any satisfactory answer to the question, when ought the body to die? for I do not know. But evidently it is a most important thing, that humanity should attempt to answer the question.

Then we seem to have seen that the force of man-life is a variety of the pan-mono-dynamic, by which all things do consist. We are not satisfied with the criticism, that life is not a form of energy because it regulates energy, for why may not some forms of energy be self-regulating and self-determining? Neither can we admit that life is determined by moleculo-chemical forces; for life may and probably does determine these. If certain life phenomena appear coincidently with moleculo-chemical changes, obviously the changes may cause the life, or the life may cause the changes, or, 3rd, the life and the changes may be concomitant effects of a common cause, viz.: the pan-mono-dynamic of the Kosmos, which emanates, has emanated, and will emanate, from the only Source adequate to account for it. We do not need to search the heavens for evidence of a vital force, for we find it in the earth under our feet, and in our bodies, as well as in the air and waters of the earth.

And when we come to search the heavens, behold, it is there also, for it is everywhere.

And we gather information regarding it as we continue to inquire, for we find that it is orderly, or that it does things usually in similar ways, so that we are able to predict in a little time to some extent what the methods of the working will be in domains of it, which we have not yet explored. We may expect to find it working by introducing cells and fibres for response and for kyticity or sensitiveness and for conductivity or unity; and we expect to find it introducing more complicated cells with more numerous connections for sensibility and for sensibility of sensibility, or what we may, perhaps, call consciousness; and even for sensibility of sensibility of sensibility, or what may be considered the knowing of other intelligences even as we are known by them. And along with the introduction of cells more complexly constructed, joined by fibres in a meshwork more and

more numerous. the life-force may weave for itself a mechanism, by which it may realise its unity with the Kosmos, of which it forms a part, and so realise the unity of human consciousness with the general consciousness, that is evidently at work to make the body a microcosm within a macrocosm, or harmony within a harmony, and which plainly is making the universe in which it moves a Kosmos on the whole and not a chaos. No doubt there is some confusion also, or some apparent confusion. There is every now and then an earthquake, a flood or a volcanic eruption in the macrocosm of Nature; just as in the microcosm of the body there is every now and then an illness, an inflammation, a fever, or a specific inflammation like consumption of the lungs. But as in the last set of disturbances we are continually faced with the question whether it is not a mismanagement of the complicated machine, with which each of us is entrusted, that is the immediate cause of the disturbances, and that these disturbances often result in better health, so in nature we ask ourselves whether, if we knew more, the natural macrocosmic intermittent disturbances might not be conducive to greater harmony and order also. It would no doubt have seemed to be a fine opportunity for the critic of Nature, who might have seen the wrenching of the moon out of the earth from the place where the Pacific ocean now is; and the critic might have occupied himself in sneering at the mismanagement of Nature because, after building up the earth, it had allowed its work to be marred in so patent a way. But, if by that act of seeming destruction or convulsion, the obliquity of the plane of the earth's equator to that of the ecliptic was effected, and if thus, millions of years before sensitive or appreciative organic and living forms appeared on the earth, preparations were made for their happiness by the introduction of the variety of the seasons, who should say that the apparent convulsion was not justified? Are not the Aleutian and the Curule islands present to this day off Alaska and Kamschatka to shew how they were in doubt as to whether they should go with the moon on her departure from the earth, or remain attached as now to the sphere of which they originally formed a part? The critic ought to be sure that

he sees the end from the beginning before he speaks. If he did he might oftener than he does remain dumb, but if he broke silence, it might perhaps be to praise and worship, rather than to indulge in cheap sneers. And he might even perhaps hear a suggestion as to whether it is good tone for the thing formed to inquire—Why am I made thus?

Then we seem to have seen that on the whole, the life-force, like the energy of which it is a variety, is just. Its laws cannot be broken with impunity, and it has a remarkable way of asserting itself, even when we may have thought that we have succeeded in contravening it with success and without sustaining damage. Above all we are struck by the conclusion that the life-force, like the universal energy, the pan-mono-dynamic of the Kosmos, is merciful, since we reflect that, although ever since we have been on the earth, we and all our kind have continually broken the laws of life, either knowingly or ignorantly, we yet survive on the planet, although the things we have done have been worthy of death.

Further we have been compelled to come to other conclusions also as that the widest-spread law of Nature seems to be attraction or drawing together, while by the same law a body less in mass resists up to the measure of its capacity, and then rotates on its axis and revolves in an orbit round its primary. We see also that one orbit and all orbits seem to be related to one another, so as to make the whole a harmony rather than a chaos, notwithstanding that there seem to be evidences every now and then of collisions and disharmonies among the moving objects of Nature.

Then coming to the particular laws of man-life again, we have been compelled to see that the special means for its improvement seem always to be accompanied by the suggestion or even command that improvement is possible only by or through the exercise of a certain amount of self-restraint: but that if we do agree to exercise this, or to allow it to be exercised for us, improvement takes place not only in our own condition, but in that of all connected with us. In this way, and apparently in this way only, can the unity of the Kosmos and our part in it be maintained and

improved. It is necessary to give up our own wills and desires to some extent, in order that the harmony of the Kosmos may be better attained. This yielding of our own desires ought not, of course, to be pushed to such asceticism as will render the body unfit to act as the instrument of man-life. Still, the individual feels and must recognise that, if necessary, he must be ready to serve even unto death, if the harmony of the whole can so be better attained, than by his continuance in life.

In our further study of the body made by man-life, for the performance of all the purposes of man-life, we were struck by the suggestion that man-life acts as if it knows and even foreknows. It seems to be so far independent of time, though working in it, that it makes provision for eventualities even before they arise. It developes the lungs, for example, from the digestive tract, many months before the lungs come into use as a chimney to carry off some of the waste products of digestion. The lungs arise, that is, in the very place where the waste products are formed. We seem to overhear the life-force saying to us that as time for us begins to be, so there comes a period when time shall be no longer, since whatever new conditions the progress of time shall bring forth, the life-force makes anticipatory provision for them. Fore-knowing further, or acting as if it fore-knew, that if the blood contains in it more material than is necessary for the nutrition of the body, the blood will tend to lay down the excess in the connective tissues of the body, the force of man-life inserts the lymph-spaces and the lymph-ducts there, in order to be ready to pick up the waste and carry it back to the blood-current for re-use, so that nothing may be lost. The life-force is therefore anticipative and economic. It seems to say, "I am independent of time; and I intend that nothing shall be lost." Also it seems to say, when one set of organs is developed from another, as the lungs are from the digestive tract, or the appendix vermiformis from the large intestine, that the function of respiration is subsidiary to that of digestion, and that the function of the appendix is subsidiary to that of the large intestine, and that it is inserted in order that, as has been already explained, by pumping a viscid gelatinous

secretion into the large gut, it shall moisten the contents of the same and so prevent the occurrence of constipation.

Besides orderliness then and justice and besides mercy, we have also anticipation or prevision to meet wants, even before they arise; and we have also economy suggested to us as one of the aims (conscious or unconscious) of man-life.

And now, besides prevision and economy, the suggestion arises to us that not only order in mechanism is a quality of the life-force, as we have seen, but also order or rank or place in the hierarchy of powers, since when one set of organs is developed from another, the suggestion plainly is that the one is subordinate to the other. If the lungs are an outgrowth from the digestive tract, that is a suggestion to us that respiration is a function subordinate to and complementary of digestion. If, as the anatomists tell us, the sympathetic system of nerves is an outgrowth from the cerebro-spinal system, then we may infer that the sympathetic nervous system is subordinate in function to the cerebro-spinal—which indeed it is, for it takes charge particularly when the cerebro-spinal is tired and has to go to sleep.

And yet here again, as the two systems of nerves are developed simultaneously, we seem compelled to see anticipation, prevision, and fore-knowledge (if unconscious fore-knowledge—a kind of paradox), and also independence of time, since organisations that are to supplement one another and to take charge at successive times are developed simultaneously.

Another of the anticipatory arrangements, or the pre-visional arrangements of man-life, appears if we consider the arrangement for reproduction, which I have not dealt with in this short essay, for we may view their introduction as exemplifying the intuition on the part of man-life that, as the body of man-life is transitory and evanescent, arrangements must be made for its quasi-permanence, these in turn suggesting higher and unknown or unapparent methods for the eternal continuance of what now seems to be only evanescent, transitory, and for a very short time.

THE LAVISHNESS OF MAN-LIFE.

One, perhaps, of the most striking facts of the force of man-life may be called its generosity or lavishness; for provision seems to be made so that if parts of the body are lost, other parts take on their work. The dexterity of the one-handed or the one-legged man, and also the greatly increased touch-sensibility of the blind and deaf is a matter of common observation, as it is also of common surprise. But in other directions also this supplemental action is very noticeable, for if certain parts of the brain or nervous system are interfered with, so that they are unable to perform their functions, other parts of the mechanism seem capable of being developed so as to take them on. The provisions for the continuance of life seem also to be seen very strikingly in the very large numbers of seeds that are always ready to carry on the races of plants, and the large litters of young that are provided to perpetuate species in animals. Of course, if human beings were to attain to anything approaching to the duration of life, healthy, happy and efficient, that apparently we might achieve, this very full and very lavish arrangement for the continuance of our race would be much less necessary. It is, indeed, difficult to inquire what the size of families would have to be in order to inhabit the earth and subdue it, in such a way as that there should be no redundancy of men on the one hand and no stint for their maintenance on the other. But the general conclusion seems on the whole to have been forced on us that while poverty and stint is the condition which we fear, the real danger is and always has been, not from poverty and stint, but that making a too lavish use of the good things of life, we shall continue to choke and block our bodies up, and so bring them to an end far sooner than they ought to reach it. There is no danger of poverty or stint at all except when we wantonly destroy the provisions made by a generous nature for our support; but the danger arises far more from a too lavish use of the good things of life and from what is very closely related to it, an unwise distribution of these good things, so that while some of us have far too much,

others among us have far too little. On the other hand, whenever, in order to rectify unequal distribution, we use force, we invariably do more harm than good, even if for the moment we seem to be effecting our purpose; for the only proper motive is persuasion after examination of the evidence on which our efforts are founded, for even good things got by force are evil. Until those who have too much, are willing to part with their surplus, after the manner of what we see going on in inanimate nature in accordance with whose laws the warmer warms the cooler, the more illuminated lightens the darker, and the more massive draws the less massive to rotate around it, so as to take their joint parts to producing an orderly universe—until this change of disposition is effected, no real improvement is possible. Force never has effected lasting improvement, never will, and never can. In persuasion and in readiness to yield to the evidence is the only hope for humanity, or for the universe in which we dwell. How this is to be achieved is not the object of this essay, although, all the phases of the life-force being varieties of one, this question is of supreme importance for each of us; but that each member of the human race should be willing to co-operate in a movement for the harmony of the whole does not seem to be an impossible hope. When that time comes, or if it comes, then may we expect that medicine, having shewn men how to live, and finding them willing to learn, may find herself unnecessary and will certainly give up those interfering and tyrannical methods, that too much characterise her now, just as ecclesiasticism has in the past too much dominated religion, and legal punishments, exile and death, fine, distraint and imprisonment, now dominate equity and justice. If this time seems, in slow evolution, to be long in coming, so long that in despair we are sometimes tempted to say, Why tarry the wheels of the chariot of progress? Why do they drive so heavily? Are not all things as they were at the beginning, or at least as they have been for far too long a time? What prospect is there that they will ever be different, or that they will ever be better? Let us remember as answering this too depressed cry, that, besides evolution, nature has recourse from time to time to mutation, in accord-

ance with which every now and again a Melchisedek arises, without father and without mother and without descent from ancestors, and that even in animal and plant forms a new organisation seems to arise for which the ancestors do not quite account. Let us reflect that a mutation, by which every man shall think not only of his own things, but also of the things of others, is not beyond the powers of Nature. All through the history of our race specimens shewing these qualities have appeared if too rarely. But, indeed, there is no evidence that such individuals are more rare than they were. The evidence, indeed, is rather the other way, the number of those who desire and hope for a better state of things, and who also work for it, being probably rather larger, than it has ever been before. The mutation, therefore, which has always affected a few, is still active; and we are filled with the hope that in due season and when the fulness of the time shall have come, and when the environment shall have been duly prepared, we may hear the voice that says "Come, for all things are now ready," and in response a general mutation may arise, and may even arise suddenly.

THE ANSWER.

Do we then feel that Nature makes us sad?
Is truth so cramping we may not enjoy
Life to the full? And must we some alloy
Mix with the gold? And may we never glad
Drink from Life's cup, as if youth never had
Scope to rejoice, free and without annoy,
Foreseeing e'er sad man in care-free boy?
And must good always prelude be to bad?
Not so; indifferent care-free ignorance,
Avid of pleasure, falls an easy prey
To each temptation, leading her astray
Unmindful that strong will is lord of chance.
Hill-streams unequal futile noisy go!
Rivers restrained deep rich and silent flow.



